BBC • MASTER • ELECTRON • ARCHIMEDES JANUARY 1989 £1·40

BBC ACORN USER

GAMES LATEST:
News and reviews for Christmas

ROLL THE DICE:
Random numbers for maps and mazes

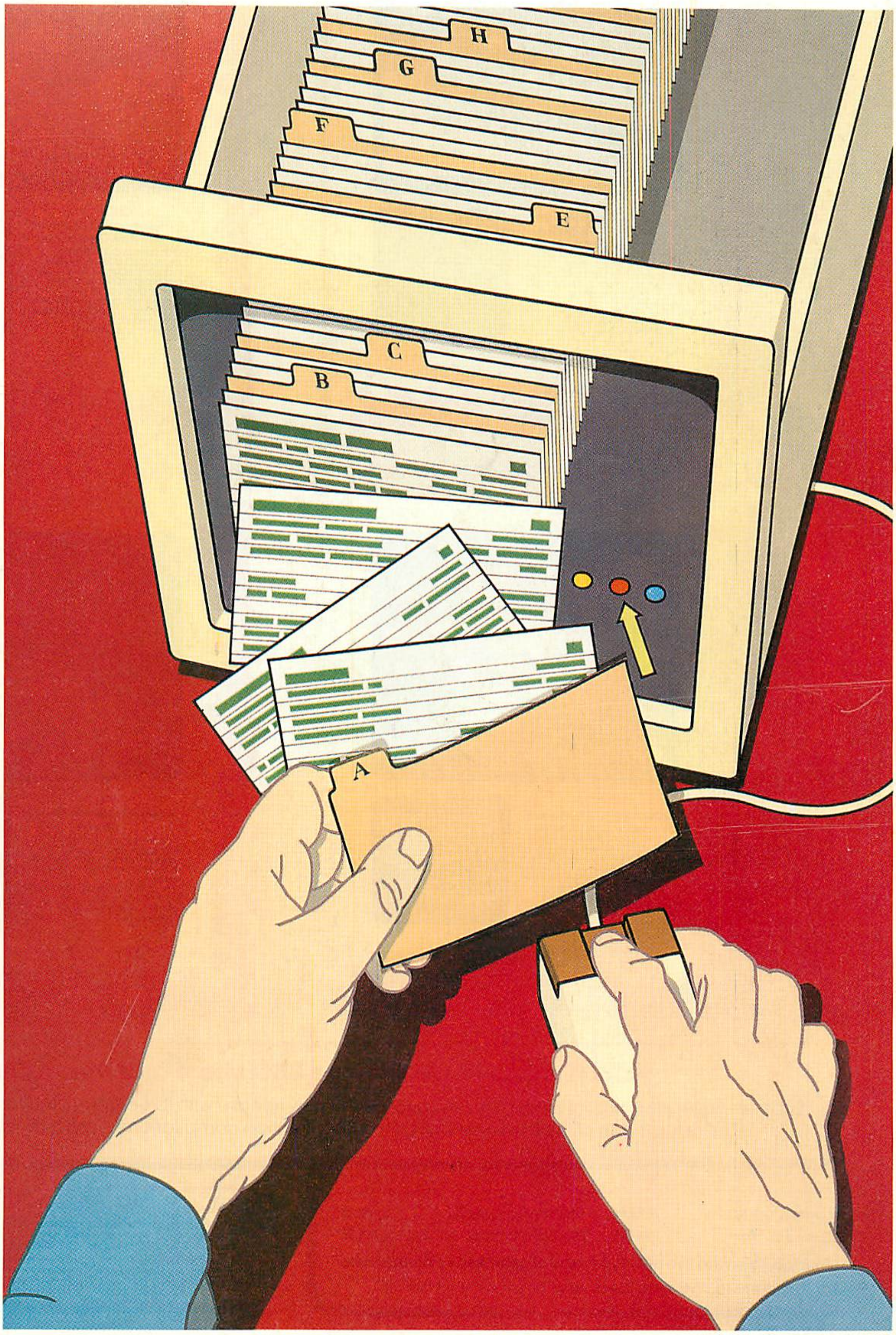
IN CAMERA:
Advice on taking screen shots

WORDPROCESSING:
Two utility ROMs for easy printing

ARC DIGITISER:
Paint by numbers with Watford

USER CARD

Easy database for BBC micros



COMPATIBILITY:
Free chart inside

PLAY IT AGAIN SAM 6

NEW RELEASE



GALAFORCE 2
A New Release from Superior Software

Everything that Galaforce was, and more – more aliens, more patterns, much more speed, more features (including collectable capsules – some help, some hinder), excellent sound effects and music.
"A wonderful shoot 'em up – fast, furious, beautifully designed and stunningly compulsive. This will be one of the top three BBC games of the year – I promise". . . .
A & B Computing (September 1988)



NOW ALSO AVAILABLE FOR THE ELECTRON



HUNCHBACK
Superior's Authentic Arcade Conversion

This superbly addictive and amusing arcade conversion is now available again for the BBC Micro and is available for the first time ever for the Electron.
"This game has excellent graphics and sound . . . a good addiction factor and is fun into the bargain". . . . Micro User



SUPERIOR APPROVED



HOPPER
Acornsoft's Classic Hit

The best implementation of the "Frogger" game. (Even better than Superior's own version!) Fast-moving with detailed, colourful graphics. Features include diving turtles, crocodiles, snakes and dragonflies.
"It's great fun . . . an excellent version of the arcade favourite. Highly recommended". . . . Micro User



SUPERIOR APPROVED



THE SENTINEL
Firebird's Revolutionary Game

Absorb your way through 10,000 different 3D landscapes. Gain height by absorbing the trees and the sentries, and finally defeat The Sentinel.
"The Sentinel is the best BBC Micro game ever. An entirely new concept. The graphics are amazing. Buy it!" . . . Acorn User



PLAY IT AGAIN SAM 6 for the BBC Micro and Acorn Electron

Superior Software has combined a top-quality brand-new release with three great classics (one new to the Electron). The result is one of the best ever four-game BBC/Electron compilations. Don't miss it for your collection!

BBC Micro Cassette £9.95	Acorn Electron Cassette £9.95
BBC Micro 5¼" Disc £11.95	BBC Master Compact 3½" Disc £14.95

(Compatible with the BBC B, B+ and Master Series computers)

Please make cheques payable to "Superior Software Ltd".

ACORN ELECTRON VERSION

Unfortunately it is not technically possible to produce an Acorn Electron version of THE SENTINEL. The four games on the Acorn Electron version of PLAY IT AGAIN SAM 6 are: GALAFORCE 2, HUNCHBACK, HOPPER and VIDEO'S REVENGE.

VIDEO'S REVENGE – An action-packed, fast-moving alien blaster from Budgie Software.
"If you can imagine Defender twisted on its side with the mentality of Rambo in a bad mood, then you are getting close to the destruction possible in Video's Revenge. Sprites are fast and furious . . . sound is wonderful". . . . Micro User.

SUPERIOR SOFTWARE Limited   ACORNSOFT

(Acornsoft is a registered trademark of Acorn Computers Ltd. Superior Software Ltd is a registered user.)

Dept 6PS1, Regent House, Skinner Lane, Leeds LS7 1AX. Telephone: (0532) 459453

The screen pictures show the BBC Micro versions of the games.

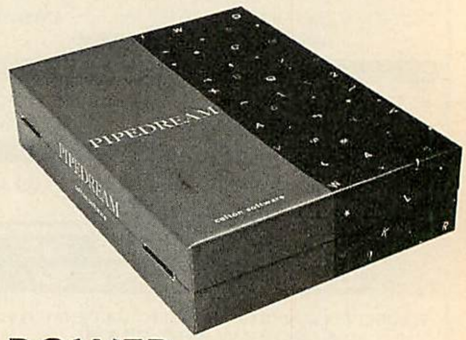
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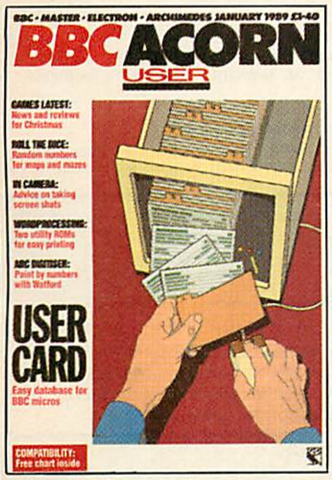


PIPEDREAM
PIPEDREAM

BBC ACORN USER

ISSUE NO 78 JANUARY 1989

COVER



COVER FEATURE

Push-button database for BBC micros, pages 66-71
Cover by Robin MacFarlan

EDITORIAL

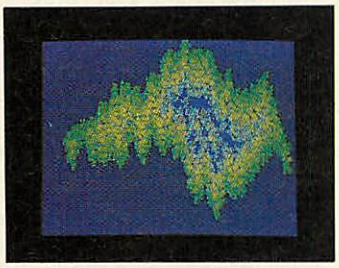
It's likely that very soon we'll all be using the word 'connectivity'. It conjures up images of computer hardware and software working together and sharing information easily.

Today's world demands connectivity — machines linking up, and even running the same software. IBM PCs can already connect to Econet via Acorn's Ecolink card. Macintoshes will link soon, and gain a User Port too. BBC Basic now runs on Nimbus, PC and Mac; soon it will go onto the Amiga. *First Word Plus* and *Timeworks* will link PC, Atari and Arc; *Pipedream* comes in PC, Z88, Arc and Beeb flavours.

Acorn's machines are well endowed with ports, and it has vast experience with over 6000 installed networks. As more people buy Arcs, more software will migrate from the PC and ST world. At the beginning of its second decade, Acorn could be well placed to exploit a need for connectivity.

NEWS

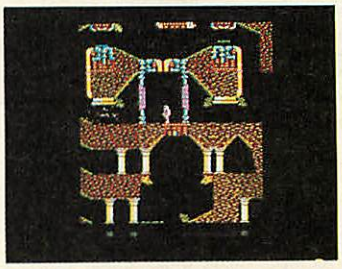
FEATURES

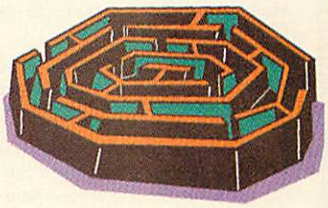


FREE POSTER

Rob MacMillan shows you how data can be transferred between different wordprocessors, spreadsheets and databases. Get them all talking to each other, using this handy reference guide. The *View* family, *Wordwise* and the *Inter* series are all covered in our great pull-out poster

REVIEWS





EDUCATION

REGULARS

NEXT MONTH

Connect your micro to other machines, meet Tony Benn and his seven BBC micros, take a look at new printer technologies: all in *BBC Acorn User's* February issue — published 12 January

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Any Acorn user including Master, BBC B+, Electron, DFS, 1770 DFS, ADFS, 2nd & co-processors A.C.P.'s BEST SELLING product containing over 30 commands inc: powerful memory & disc editor, search memory/disc/basic, catalogue/unplug ROMS, load/run programs below page, automatic menu, file transfer (inc locked cassette files), ADFS utils etc etc ("It's superb" . . . Database Pubs. - "A top class toolkit - I have no hesitation in recommending it". . . Acorn User Nov '86 (16K EPROM & FULL MANUAL)

ADVANCED CONTROL PANEL (20)/M/B/E/C — £34.50

ACP is a front end control panel language providing a sophisticated yet friendly interface between user and computer for access to Languages. MOS functions and the users own file utility etc. Main features include pull down windows, simple to change MOS configure, floating point calculator, file manager, SW ROM's facilities. (16K EPROM & FULL MANUAL)

"It's very easy to create an entire customised front end for your own use." – *Acorn User, August 1987.*

"ACP is much better than any of the other front end systems I've seen." – *Acorn User, August 1987.*

"I can recommend it to anyone who wants easy access to the Electron's functions." – *Electron User, August 1987.*

ACPs main features are:-
★ Pull down windows operate throughout
★ Users can create their own windows

PRES Archimedes Utilities — New Product . . . A low cost utility for Arc users containing . . . memory allocation map, screen mode table, file type listing, module interogator, continuous compaction and hard disc back-up.
Only £11 ex VAT, £12.65 Inc.

ADVANCED ELECTRON DFS (05)/M/B/E/C — £24.15

Electron & Plus 3 users . . . gain BBC compatibility by adding the Advanced Electron DFS (1770 DFS) this is the same disc filing system supplied with the BBC B+. Now you can produce and access (compatible) BBC disc based software. We can also supply 5.25" disc drives to add to your Plus 3 (inc 2nd drive adapter). "ACP has produced another superb ROM for the Electron". . . Electron User Feb '86 (Supplied on 16K EPROM + DFS MANUAL)

Also DFS E00. An alternative to the DFS, designed for use in Sideways RAM (ABR). **(14)/E + ABR** (3.5" ADFS disc + manual) ***£19.99***

ADVANCED ROM ADAPTER 2/M/E — £13.00 excl VAT: £14.95 Inc VAT

An Acorn approved cartridge containing a card with special 'zero' profile sockets that allow you to fit compatible 8k or 16k EPROMS/ROMS. The cartridge is fully enclosed providing complete protection for your ROMS. Simple to use - No switching - complies fully to the Acorn (sideways) ROM filing system. "The best ROM cartridge is by far the ARA 2. . . ***A&B Dec 86***

ADVANCED BATTERY-BACKED RAM M/E

A standard Acorn approved cartridge but containing 32k (2 x 16k) of sideways RAM. The added bonus is the battery-backed feature that holds the RAM contents when the power is switched off! Different ROM images can be loaded into either bank from ROM images previously saved. The banks can also be locked to imitate ROM use. Now it is possible to have View & ViewSheet in one cartridge every time you switch on. Other uses include &EOO ADFS, printer buffer, ROM software development. The use of ABR is simplified by the newly written PRES software utilities which include:- SaveROM, LoadROM, Lock, Unlock, Printer Buffer, Zero and MakeROM a new utility to put your own software from disc or tape into ABR and use the ROM filing system. All software is supplied in ABR with a simple menu to transfer the utilities to your own media. No hardware switching - totally software controlled. Instructions for using supplied software and necessary information for users developing their own applications.
"It's a superb add-on and a must for all serious Electron Users". . .
Electron User **£34.77 excl VAT; £39.95 incl VAT**

Special limited offer for Master Users AMX Mouse package with Supercart software and Mk III Mouse. Previously over £60 —
PRES price £29 ex VAT, £33.35 Inc.

ADVANCED PLUS 7 /M/E/B/C — £39.00 ex VAT; £44.85 Inc VAT

An internal battery-backed RAM upgrade for the Advanced Plus 6. TWO 16K pages of Sideways RAM, battery-backed and featuring full write protect facility. Just like ABR but fitted internally & vacating a cartridge slot. This product is compatible with all Acorn BBC/Master & Electron computers.

ADVANCED DISC INVESTIGATOR (06)/M/B/E/C — £28.75

A very powerful Disc utility for standard & non-standard discs. Backup most protected discs, edit any type of non-standard disc, check & repair faulty tracks, create new disc formats, copy 40 track discs to 80 track discs, verify two non-standard discs.
("ADI features an extremely comprehensive sector editor, and one of the finest I've seen". . .Tubelink on Prestel) (supplied on 16K EPROM + manual)

ADVANCED 1770 DFS

3 versions ADM/C(11) - ADB(12) ADE (13) — **£34.50**

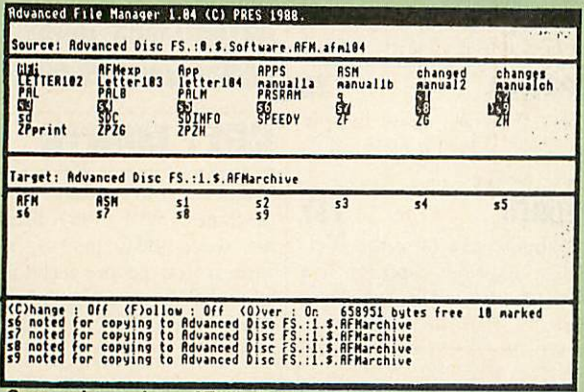
ACP have totally re-written the Acorn 1770 DFS, enhancing existing features & adding new ones. The result is a very fast and powerful disc filing system with the ability to operate in double density occupying both sides of a disc (640K). Automatic file relocation, improved file handling, 62 file catalogue and Sways RAM can be used as a fast RAM DISC. (16K EPROM + comprehensive manual)

PRINTER . . . Panasonic KX-P 1081 Graphic Epson Compatible NLQ ready to connect including capable, delivery and VAT £155.65 ex VAT £179.00 inc VAT Ribbon £5.50 + VAT

DISC DRIVES	Ex VAT	+ VAT
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Cumana 5.25 single/sided 40 track, inc psu	£112.17	£129.00
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PRES special 3.5 single/sided 80 track, inc psu	only £59.00	£67.85

PRES – ADVANCED FILE MANAGER M/B/E/C

The ultimate 'front-end' for ADFS and DFS includes:



Screen picture shows AFM in Copy mode on Master Turbo

AFM follows the PRES 'Master Plan' of upwards compatibility – it runs on Electron, BBC B, B+, B+128, Master 128 and Compact, with Second/Co-processors and Acorn-compatibile versions of DFS & ADFS.

AFM has four distinct modes:

MENU – allows browsing through the files and directories on a disc. Files are started from a menu of up to 7 options chosen for a selected ROM. Loaders are provided for Basic, The Basic Editor, View, ViewSheet, ViewStore, ViewSpell, Edit, Wordwise (+) and InterWord. This list can be expanded infinitely using an Acorn-approved OSWORD call. . . full details and example in the manual..

DELETE – allows files to be marked and then deleted with one keystroke.

RENAME – allows one or more files to be marked and then renamed using a wildcarded name, ie one which varies with each file renamed. Thus you could rename s1, s2 and s3 to be s1_old, s2_old, and s3_old in one operation. . . and that's only the beginning! As well as using the whole of the original name you can also pick out individual characters to form part of the new name.

COPY – the strongest feature of AFM. It is a two stage copy routine. With both source and target directories shown on screen the files to be copied are marked. Once all the files have been marked copying is started and the computer can be left to get on with it!

Large files can be split across several disks, and recombined.

As much as possible of the computer's memory is used for copying files, including unused parts of shadow screen memory, sideways ram banks (inc. AP7), ram cartridges (inc. ABR (32K) and AQR (256K)), tube memory (up to 61K), B+ paged ram (12K) and unused parts of the Slogger Master Ramboard (Electron).

Comprehensive error trapping and recovery is provided, so a copying run will rarely have to be aborted unfinished! And there's much, much more.

THE ADVANCED PLUS 3

Now you can turn your Electron & +1 into a full disc system - no more waiting for tape loading or 'bad block'/'data?' messages. A.P. 3. gives you. . .

UNBEATABLE PRICES

OUR TOP SELLING PRODUCT

1. A fully Acorn compatible 1770 interface
2. 80 track 3.5 disc drive, as used by Acorn (320K capacity)
3. Separate PSU
4. Acorn ADFS
5. Welcome disc
6. Utilities
7. Full documentation
8. All the advantages of the original Plus 3 PLUS extra ROM socket.

All this without dramatically increasing the required desk space!
Now well into the SECOND THOUSAND production.
Remember - 2nd drives (3.5 or 5.25) can be added and the AP3 drive can be used on a BBC or Master computer! Also most Electron disc-based software is supplied on 3.5 ADFS discs.
The only fully compatible disc upgrade running Acorn's own preferred filing system (supplied on: Plus 3, Master 128, Master Compact and now the Archimedes)

EXTRA BONUS
3 games on disc - SNAPPER - DRAUGHTS - REVERS!

COMPLETE PACKAGE ONLY
£99.00 excl VAT; £113.85 inc VAT

ADVANCED PLUS 1. . .The plus 1 is the main expansion for the Electron. It provides the Centronics parallel printer, printer port, joystick interface and 2 cartridge slots into which go ROM cartridges including View, Viewsheet, Pascal, Logo and our own popular AP4 disc upgrade.
£43.43 excl VAT; £49.95 inc VAT

ADVANCED PLUS 6. . .a fully buffered 6 ROM expansion module for the Electron user. AP6 is fitted inside the advanced Plus 1 or modified Acorn Plus 1 (when used with the Acorn Plus 3, 5 ROM sockets are available). All sockets are designed to accept either ROM/EPROMS or RAM chips. A further feature is the optional AP7 upgrade.
"A marvellous piece of design. . .don't hesitate buy it!" - *EU, May '88*
£33.00 excl VAT; £37.95 inc VAT

UPGRADE SERVICE for the original Acorn Plus 1 to Advanced Plus 1 and AP6. This will provide all the benefits of AP6 and also includes the printer circuit modification fo some modern printers. (AP6 can be fitted to original Plus 1 by users with soldering experience) for upgrade service add £7.000 + VAT to AP6 price ie
£40.00 excl VAT; £46.00 inc VAT
Incl. Mod Fitting + Testing & Carriage. Send to:
P.R.E.S. Service Department, PO Box 34, Shipley BD17 6DE

ADVANCED PLUS 5

A unique interface for those wanting the maximum expansion from just one slot in the PLUS 1 AP5 contains:- A User port for connecting peripherals such as a mouse. 1 MHz bus allowing Music 5000(e), prommers and various control devices to be added. Tube interface for connecting and Acorn 2nd processor or even a Master Turbo board (through a 'Co-Pto Adaptor') - & TWO spare ROM sockets (1 high priority). All hardware connections are Acorn compatible thereby allowing many BBC products to be added (remember that some software modification may be necessary for the Electron). So although some expansion options may appear expensive on an Electron you do have upward compatibility.
£55.00 Ex VAT; £66.70 inc VAT

Advanced Plus 2 ROM

We feel this is one of the best, low cost, additions we have produced for the Electron & +1 user, especially for Plus 3, AP3, ABR & AP7 users now with this easy to fit upgrade you can add:

1) Fix for Tape filling system in Hi-res screen modes. 2) * ROMS- displays ROM/ROM images present. 3) * UNPLUG disable ROM/RAM image. 4) * INSERT - enables or inserts a previously unplugged ROM. 5) * KILL - totally disables the Plus 1. 6) * LOCK - locks a sideways RAM bank in ABR, AQR, AP7 7) * LROMS - locks all sideways RAM banks found. 8) * UNLOCK - to unlock a sideways RAM bank in ABR, AQR, AP7 9) * UROMS - to unlock all sideways RAM banks found. 10) * SAVEROM - saves a ROM image to current filing system. 11) * LOADROM - loads a ROM image from current FS into a RAM bank. 12) * FORMAT - will format an ADFS disc for Plus 3 or AP3. 13) * VERIFY - tests every sector on an ADFS disc. 14) * VFORM - formats and verifies an ADFS disc in one command. 15) * BUILD - creates a text file that can be used by *EXEC (ie !BOOT). 16) * LIST - displays a numbered listing of a text file 17) * TYPE - displays a file on screen with no line numbers. 18) * DUMP - to view a file's contents on screen. 19) * LANG - selects a default language to be booted on {CTRL-BREAK} 20) * HELP - provides a full 'help' list on all the ROM's commands. 21) * AQRPAGE - selects specified page in AQR.

Now there is no need to search for your utilities disc every time you want to Format/Verify a disc, Build a !BOOT file or lock/unlock/Load a ROM image into ABR PLUS much more . . . . . the ideal companion from the company that produces the Acorn Plus 1.
£11.00 ex VAT; £12.65 inc VAT
The AP2 is the definitive Plus1 ROM. . . . .I'm not sure what i'd do without it. . . . .like all of PRES's other products, it's been well worth waiting for" July '88

FILING SYSTEMS

ADFS VERSION 1.1
Suitable for existing Plus 3 or A.P.4 users. This new version has the software fixes for Zysyshelp, write protect disable & compaction. Also Winchester code has been replaced with the necessary driving software to handle AQR as a 256k RAM DISC. Please note - ADFS is Acorns adopted standard filing system supplied on the Plus 3, Master 128, Master Compact & now the Archimedes. Supplied on 16k ROM with Welcome disc & utilities. Please state 3.5/5.25 welcome disk.
£14.95 ex VAT; £17.19 inc VAT
(ADFS manual supplied separately)

ADFS EOO
For Electron users with either Plus 3 or A.P.4 and 32k of S/W RAM i.e. ABR. All the benefits of ADFS but without all the loss of RAM! Includes all the software 'fixes' call for managing the new & original ADFS. One of the most frequent question we are asked: "How do I get back the memory lost on my Plus 3 system?" Answer: PRES ADFS & EOO regains 3.75k leaving page @ &EOO the same as Tape!
ADFS EOO supplied; 3.5 ADFS (manual available separately)
£14.95 ex VAT; £17.95 inc VAT
5.25 ADFS (manual avail. sep.) £14.00 ex VAT; £16.10 inc VAT
5.25 DFS(2 discs+ADFS manual) £19.00 ex VAT; £21.85 inc VAT
(See Special Package Prices)

DISC INTERFACES (Plus One required)

AP3 INTERFACE: As supplied with AP3 package. A fully Acorn compatible disc interface that will accept any standard 5.25 or 3.5 80T drive with PSU. It runs Acorn's ADFS (as supplied on Acorn Plus Three, Master 128, Master Compact and now the Archimedes) supplied with A.D.F.S. manual and welcome disc + Utilities and 3 bonus games (please specify 3.5 or 5.25 80T format). Also provides a spare 16K rom socket. **Price £52.00 ex VAT £69.95 inc VAT**

AP4 INTERFACE: A fully Acorn compatible disc interface that will accept any standard 5.25 or 3.5 drive with PSU. It runs the 1770 DFS (as fitted in the BBC 'B' and Master) keeps pace at &EOO - has utilities in rom and provides a spare 16K rom socket (DFS manual included. **Price £61.36 ex VAT £69.95 inc VAT**

AP34 INTERFACE: Get the best of both filing systems. Now available from PRES the ultimate interface. Fitted with both Acorn approved filing systems. . .Acorn's current standard ADFS and Acorn 1770 DFS (which can be run at &EOO) ADFS and DFS manuals supplied + ADGFS welcome disc with utilities.
Price £69.55 ex VAT £79.98 inc VAT

SOFTWARE PRODUCTS

ADVENTURE GAMES 5 different adventure discs:- Ultimate Prize, Dreamtime, Priate's Peril, Taroda Scheme & Stranded.
All 3.25 ADFS £6.95 ex VAT £7.99 inc VAT each disc

Advanced Games Compendiums - on disc with so many of our products providing more 'serious' add-ons for the Elk; we thought it was time to allow easy Access to some of the favourite games ON DISC! . . Three volumes of popular games, previously only available on tape, now 'instantly' loadable from menu on disc. Titles such as Croaker, Felix & Fruit Monsters, Killer Gorilla, Danger UXB, Swoop, Ghouls, Invaders, Swag, Galactic Commander, Felix in the Factory, Bumble Bee, Gauntlet, Frenzy, Moonraider, Positron etc. etc.. Each volume contains EIGHT menu selectable games.
3 ½ ADFS £9.99 ex VAT £11.49 inc VAT
5 ¼ DFS. £8.99 ex VAT £10.34 inc VAT

View the Acornsoft word process for the Electron & +1 inc. full documentation £14.94 inc VAT
ViewSheet The Acornsoft. . . . . spreadsheet for the Electron & +1 inc. full documentation £14.95 inc VAT
View & ViewSheet special price . . . . £22.00 inc VAT

SPECIAL PACKAGE PRICES

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AP1 + AP6	£69.52 ex VAT	£79.95 inc VAT
ABR + 3.5" ADFS E00	£44.30 ex VAT	£50.95 inc VAT
ABR + 5.25" ADFS E00	£43.33 ex VAT	£49.95 inc VAT
ABR + 5.25" DFS (ADFS E00)	£47.78 ex VAT	£54.95 inc VAT
AP5 + Music 5000	£152.17 ex VAT	£175.00 inc VAT
AP7 + 3.5" ADFS E00	£49.52 ex VAT	£56.95 inc VAT
AP7 + 5.25" ADFS E00	£48.65 ex VAT	£55.95 inc VAT
AP7 + 5.25" DFS (ADFS E00)	£52.13 ex VAT	£59.95 inc VAT
AP4 + CS400	£147.78 ex VAT	£169.95 inc VAT
AP1 + AP4 + CS400	£182.60 ex VAT	£209.99 inc VAT

********** ACCESSORIES **********

Electron power switch This useful accessory provides a double-pole in-line switch with a new power jack-plug already attached: just connect to the existing lead, heaving removed the old jack-plug.
Plus 3 2nd. drive adaptor converts the fitting at the back of the original drive which has been configured to Drive 1.
AP3 2nd. drive lead replaces existing drive cable with one containing an extra connector for adding a second drive configured as Drive 1.

Electron Advanced Users Guide				£3.95
Electron Assembly Language book by Bruce Smith				£2.95
Software on disc for above	3.5 ADFS	£3.50	5.25	£2.50
ADFS Guide Manual				£5.00
DISCS 3.5 10 in plastic library box				£19.95
5.25 twin gift pack				£1.49

M = Master B = BBC C = Compact E = Electron

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NEWS

RISC OS receives CC's approval

The new Archimedes operating system RISC OS – to be released in April – has found an unlikely supporter in Charles Moir of Computer Concepts. He was so dissatisfied with the current system, Arthur, that he developed his own operating system, Impulse, to use with new Computer Concepts programs and his RISC processor card for IBM-compatibles. The programs will now run under either RISC OS or Impulse.

Having seen RISC OS in operation he said: 'It overcomes the old problems with Arthur.'

Ample albums

Hybrid has released five more albums of Ample music at £4.95 each and the Music 5000 Synthesiser Junior price has been fixed at £99.

BBC supports Mac



The BBC is to support the Apple Mac running its interactive video discs, as well as the Domesday system and the IBM PC.

A Mac Plus or SE controlling a Laservision player with its own monitor was due to be demonstrated at the BIVA show. The software for the *Ecodisc* (above) was written using Hypercard.

Arc offer

Watford Electronics is giving away a free Panasonic printer worth £170 with all Archimedes systems.

New era begins for BBC users

The end of 1988 marks a watershed in the history of Acorn Computers, and of *Acorn User*. Acorn celebrates its tenth birthday in December, and is coming out of its youth, symbolised by 8-bit hardware, and into the world of 32-bits and Unix.

There is now no Acorn-badged machine costing less than £2500, and even when the 410 Archimedes appears, it will cost some £1500. All the sub-£1000 machines are in BBC livery.

And *Acorn User's* reader base is at the cheaper end of the range, from the BBC B through the Electron and Master to the Arc 310.

Our change of name reflects that fact. It also denotes that Redwood Publishing, and hence *Acorn User*, are a division of the BBC. So the magazine has the right to use the famous BBC logo.

Redwood has been a part of BBC Enterprises for some time. Although this hasn't affected the editorial balance of the magazine, over the next few months the magazine will get a new, fresher look. It has been retitled *'BBC Acorn User'*, to reflect the fact that most of the readership of the magazine have Acorn computers with the BBC name.

Despite the change in look and name, our mix of articles, ranging from professional applications through the best educational coverage to programming utilities and advice on wordprocessing, will remain as informative as ever.

The new name won't rule out the Electron – the present coverage will continue. And Arc users need have no fear: their machines will continue to be written about too. *BBC Acorn User* will still support the whole of the BBC and Acorn range of machines.

The same authors, the same coverage, a new look: the same magazine but different. We know you'll let us know what you think. Please continue to send your observations, congratulations (!) and complaints to the same address.

Price war starts

by Christina Neal

CDS is offering hardware at trade prices — worth up to £200 on an Arc 310 — but you have to pay £150 to join the club first. The introduction of 'warehouse marketing', which has been a big success in the US, is sure to spark off a storm among dealers.

However, Acorn's hands are tied. 'We can't tell dealers what to charge,' said spokesman Michael Page. But he added: 'All bargains have to be looked at very carefully.'

Dealers have criticised the idea on the grounds of the lack of support, but CDS plans to employ its own machine experts at the end of a phone hot line.

John Simnett of Acorn distributor Kelator warned: 'Dealers offering high levels of discounts have a long history of going into liquidation.

'Some operate from a private house or a lock-up garage, and find that even the most basic computer can go wrong. Kit gets sent back to them and they can't handle the problems.'

Andy Spoor of CDS replied: 'The number of members we've got makes it sufficient for us to sell computers so cheaply. We also have technical support so you can phone us if you want to.'

Unix clash in new year

The battle to dominate the market for cheap Unix workstations is warming up.

Atari claims its transputer workstations will be available this month with an entry-level price of around £1500.

Atari's machine challenges Acorn's Unix system – expected to cost £4000 – when it is launched in the new year. Both computers offer new technologies to deliver high performance cheaply.

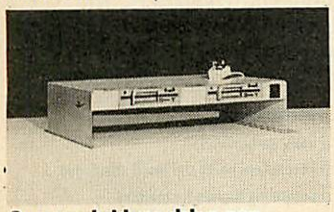
Acorn will be selling a popular range of business software to go with its system. *Uniplex II Plus* is an integrated package with wordprocessing, spreadsheet and database.

NEWS IN BRIEF

■ *Euclid,* the 3-D graphics package from Ace Computing, has been upgraded. Extra facilities such as shading to show the source of light have been added and the program has been made simpler to use with the addition of a new help facility. The price remains the same at £45.

Users who have already bought and registered their copies will receive the upgrade free. The program consists of two parts, the *Euclid* design program itself and a relocatable module which allows programmers to incorporate Euclid features into their own programs.

■ A range of new BBC bridge-unit disc drives from Cumana features various combinations of 40 and 80-track drives in both 5.25-inch and 3.5-inch formats.



Cumana bridges drive gap

They allow users to transfer data and programs between the various disc formats. Prices range from £269 for the double 40-track 5.25in drive and £309 for the double 3.5in drive.

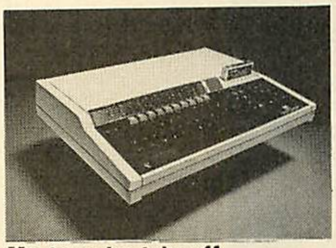
■ A new book from Sigma Press considers the complex issue of language translation by computer. *Computer Translation of Natural Language,* £12.95, discusses the problems found in translation. Readers can also buy a BBC micro disc explaining the solution the book's authors found, and including enough data for them to make simple translations themselves.

The languages used in the translation examples are French and English.

Extra Master sales cause shortage

Demand for the Master 128 has exceeded Acorn's expectations, and dealers are having to ask customers to wait while more machines are built. Despite Acorn's decision to produce an extra 40,000 machines earlier this year, demand for the computers remains unsatisfied. Acorn production manager Jim Merriman says Masters are being built as fast as possible and another 25,000 have been ordered for the first half of next year.

Apparently Acorn was surprised by sales of the Master. But David Bell, microsystems manager at the company, admits: 'There is still a great need for this type of product.'



Master sales take off

John Simnett, director of major Acorn distributor Kelator, said: 'The demand for Masters has exceeded Acorn's expectations, and they haven't been able to ramp up production fast enough.

'Sales have been improving rather than dropping off as expected. It's very frustrating for us but augurs well for Acorn.

'It may be that the LEAs are filling primary schools with Masters. Certainly one school I know has suddenly acquired eight of them. Whatever, there will be a shortfall till the end of the year.'

Some users have felt that Acorn has neglected support for its older products, but David Bell insists: 'There is plenty of new software coming out for our 8-bit machines. But most of it is for the educational sector and is not widely publicised outside the specialist press.'

Safety drive at show

The Archimedes has been helping to steer motorists to a better understanding of road safety. Visitors to October's Motor Show in Birmingham were able to design cars using a specially-written interactive program which emphasised safety.

They were given three minutes to put a car together by choosing pre-defined car parts from the program with the help of a special 225-key electronic touch pad. At the end of each day the best design won a prize.

The program was a feature of Birmingham City Council's stand, which was promoting road safety. Another Archimedes showed weather and roadworks information from the AA Roadwatch, decoded through a teletext adaptor.

The programs were designed for the council by Crystal Presentations, a Birmingham company which specialises in computer-based displays.

Arc shares Econet work

ARCshare, the program for Econet networks which allows one Archimedes to do all the processing and thus speed it up, is now available. It costs £159.85 for a 10-station system and additional 10-user packs are £34.50.

John Simnett of European Communications Group said: 'Econet will be around for a long time.' The speed of the Archimedes could eventually lead to the adoption of a new standard such as the more expensive Ethernet.

Mac transfer widens View

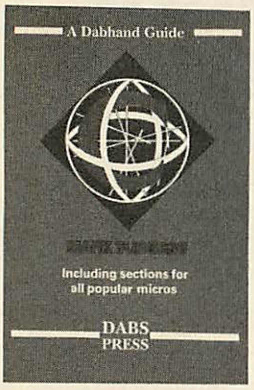
Moving files between totally incompatible computers used to be extremely difficult. At best you could try to transfer a plain text file with all codes removed.

But the increasing variety of computers in schools and offices demands a more practical solution for users skilled only in using familiar applications.

The new version of *View > Mac* from Human Computer Interface helps users with BBC machines and Apple Macintoshes. It can transfer files from a range of BBC programs — *View, Wordwise Plus, InterWord* and *View Professional* — into *MacWrite* and back again. The program is available on Mac disc with an educational price of £67.85. Users of the earlier version can upgrade for £21.85.

OFFERS

THE C HANDBOOK



The comprehensive guide to C

A behind the scenes storm has quietly been sweeping the microcomputer world during the last few years: it is the C programming revolution.

Mark Burgess has just completed perhaps the most comprehensive guide to C ever written. In a mammoth 512 pages he introduces the C philosophy in a highly readable no-nonsense manner. Page by page, you ascend the C ladder with simply illustrated and documented programs.

With 37 chapters, six appendices and glossary this book is amazing value for money. Programs from the book and many other useful utilities can be found on the program disc which comes with a user guide. Don't miss out – add this important publication to your library now.

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______ copies of C and 5.25-inch disc for PC (Master 512) at £19.95.

Please circle as appropriate: 40/80-track/ADFS/DFS/BBC/Master/Compact/Archimedes

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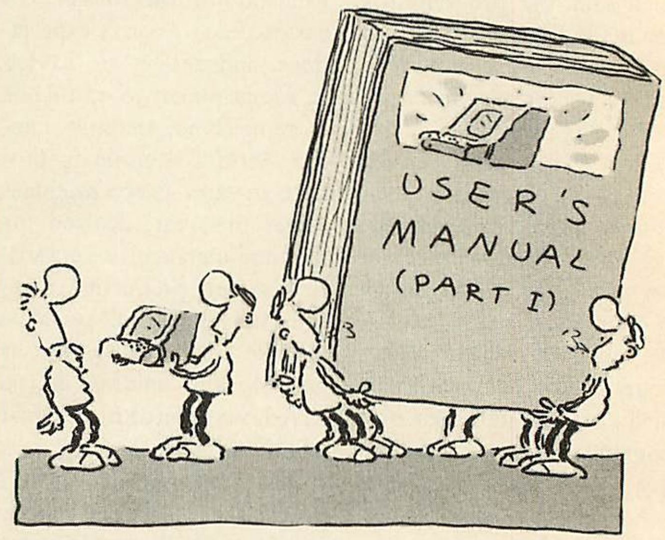
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- ☐ **Government policy and how it affects you**
- ☐ **Computing courses for teachers**

A classroom project is run in every issue. Recently we carried a very popular conservation project – tree-planting and pond-dipping were just two areas covered.

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'Mind-blowing' ray tracer

Clares Micro Systems is now ready to release its ray tracing program, *Render Bender*. Work made possibly by the program was first seen on the demonstration discs Clares was selling earlier this year, with both still and animated ray-traced pictures.

Stuart Watson, a designer working with Clares on the project, describes the pictures which can be created as 'mind-blowing'. Objects drawn must be precisely aligned so that their reflections appear in the spheres the program provides. Once this is done the view-point and direction of light can be changed. Animation sequences can be stored and run.

Watson's design studio, Chameleon, is using Clares' package *ProArtisan* to design artwork and packaging both for Clares and other customers. 'We're trying to turn it into a package for design studios. At the moment it's great value for visuals and as a presentation tool, because it can quickly manipulate and change colours and textures.'

Watson is currently designing the packaging for a range of cosmetics and beauty care products using *ProArtisan*.



Graphics by ProArtisan, dumped by HP Paintjet

Lindis goes Dutch with new programs

The Archimedes world is expanding fast. Two new programs distributed by Lindis International originated in the Netherlands where the Arc is becoming a favourite with programmers.

Archimedes Image Manager was designed by a team at Delft University. It helps users clean up and edit pictures they have digitised on the Archimedes. Because it is a 'shareware' product, Lindis is charging only £9 per copy to cover duplication of the disc and the manual. '*AIM* gives you a clearer, sharper. image with digitised pictures,' explains Lindis' Jack Lillingston.

The second program is provisionally known as *X-Ample Story* after the Dutch company which originated it. It allows you to link together and store on one disc up to 20 pages of text, graphics and sprites. This can then be scrolled over images such as those supplied by the *AIM* package. The price has not yet been fixed but the program should be available from the beginning of January.

THE COMMS COLUMN

■ About 200 people attended Adventure T88, the annual convention of players and designers of on-line multi-user games and computer adventures. It was organised by Clubspot, and held in Sutton Library on October 22. Several talks were given by leading adventure designers, particularly in the multi-user field, such as *Tiger Tiger, Tarin,* and *Locoman,* who talked about the construction of multi-user games.

Many games were demonstrated such as the well-known *Shades* run by Telemap, *MUD2* from *Acorn User* contributor Simon Dally, and lesser-known ones such as *Guildhall* and *Trash*.

A new game handling system known as *The Butler* was launched at the convention. This is a system designed to route callers through to a number of adventures from one telephone number. The various games may be in the same location, or elsewhere.

The system is now running offering *Gods* and *The Zone,* two leading multi-user games, on 01-994 9119, on V21 (300/300 baud) and V23 (1200/75 baud) speeds. *(The Zone* formerly ran on 01-683 4507, and is a multi-user game for adults only.) Further information can be obtained either by asking people on the systems mentioned, from Clubspot's adventure section *Arena* which can be found in the Clubspot area of Prestel, or from Sheila Thomas, Prestel Mailbox 011110770.

■ At the recent *Micro User* show, I was given an early demonstration of *ArcComm,* the long-awaited Archimedes comms package from BBC Soft. The program is unique in its ability to work with all higher levels of viewdata as used by the French MiniTel and German Bildschirmtext systems, which combine Prestel-type frames with high-resolution graphics. The program, which will only work under the forthcoming RISC OS, looks amazing — but no release date was forthcoming from BBC Soft. You can ask them yourselves on 01-576 0548.

■ New to the bulletin board scene is the *London City Magazine,* a BBC-oriented board run in London by Brian Green. It runs on SAFBBS software, and operates at V21 and V23 speeds. Both scrolling and viewdata formats are supported. General leisure interests feature strongly with sections on pop music, satellite TV, poetry, and horoscopes. There is a mode 7 graphics gallery, and a small selection of downloadable BBC programs. The board supports the CET format for downloading, and is on 01-468 7648, 24 hours a day.

■ The bulletin board spotlight falls on Alternative Reality, a scrolling viewdata board running on a BBC with HBBS software, operated by Robert Walker. If a scrolling terminal is used, you have the option of using mode 7 colour. The board contains BBC downloadable files, some on-line adventure games, including *Hitchhiker* and *Mad Island,* on-line psychiatric sessions with Eliza, a BBC software chart, and voting system, and many more items of interest to BBC users. There is even some Archimedes material included. Alternative Reality runs 24 hours a day at V21 and V23 speeds on 0959-76695.

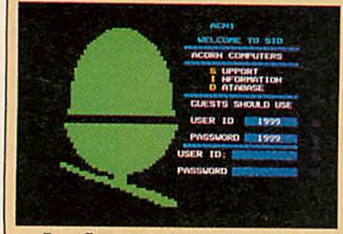
■ *If you have any comms news for David Atherton, send it to him here at BBC Acorn User, 20-26 Brunswick Place, London N1 6DJ, or alternatively to his mailboxes on Prestel 942876210 or Telecom Gold/Microlink 72:MAG11596.*

CUSTOMER HOTLINE

Phil Colmer is Acorn's head of customer liaison – in fact, he glories in the title Support Information Services Manager, Customer Services Department. This is the first of his columns for BBC Acorn User *on the subject of Acorn's customer support.*

■ SID is the name of Acorn's Support Information Database. It's an on-line, Prestel-type system that contains technical information on Acorn machines, reviews and news. There are also a number of special-interest areas that act a little like bulletin boards. You can post mailboxes to the customer support team at Acorn, so your own queries can be answered. In the past, you have needed to subscribe to SID, and to pay time charges of 8p per minute. But now you will be pleased to know that we have dropped the subscription charge, and you will only be charged for time spent on-line, with a minimum charge of £10 plus VAT per quarter.

The trial offer has also been slightly changed. If you return a completed direct debit mandate to me, you can try SID for three months and just pay for the used line time, without the imposed minimum charge. After those three months, the minimum line time charge will come into effect.



Leaflets giving more information on SID, along with direct debit mandates, are available from Customer Support (see below). Don't forget that you can look at most of the system anyway by ringing the demonstration system on (0223) 243642 with standard viewdata software.

■ For those of you who want to make the most of your 512 co-processor, we have three application notes which may make a difference. These are *Master 512: applications compatibility and software list; Master 512: technical information and monitor documentation* and *The Edlin and Move user guide*. All three are available free of charge on request from Customer Support.

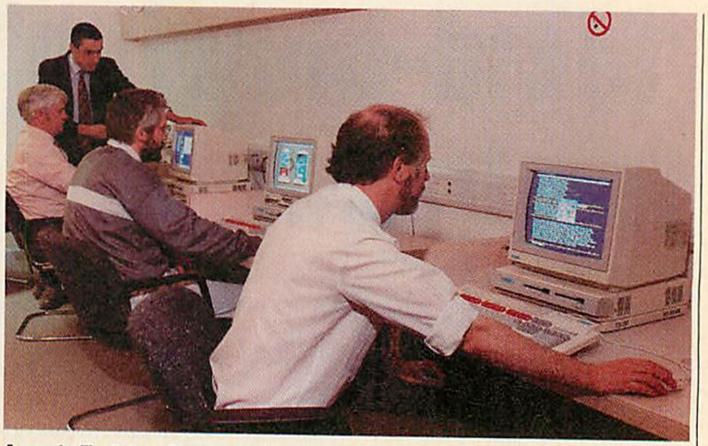
■ If you use the PC Emulator (version 1.20) on an Archimedes 310, you might not know that more MS-DOS memory can be obtained easily by starting it with *PC.PC instead of *PC. Emulate. If you don't have version 1.20, you can upgrade by sending your PC Emulator disc with a cheque for £15 to Customer Support.

■ May I take this opportunity to remind you of the best way to obtain technical support. In the first instance you should try your local dealer – a list is available from Customer Support. If this fails, then please feel free to write to Customer Support. In both instances, please provide as much information as possible on the problem, such as the version number of the software you are using.

Obviously, if you have a SID ID, then you will get a faster response using the technical mailboxes provided for that purpose.

■ To get a faster response to any query or request that you post to us, please address it to Customer Support, Acorn Computers Ltd, Fulbourn Road, Cherry Hinton, Cambridge, CB1 4JN.

■ This is the first of Phil Colmers monthly column in *Acorn User*. If you have any suggestions or comments on its contents, write to Phil at the above address or leave a message on SID.



Acorn's Training Centre hosts several courses a week

Training takes off

The increasing professionalism of the Acorn world is being shown by the growing number of organisations offering training courses to dealers and customers. Acorn itself was first off the mark with its Training Centre attached to the company's Newmarket Road offices in Cambridge.

Now distributor Kelator and dealer Hugh Symons Group have both announced their intention to run courses. Hugh Symons Group has already set up a new division, Computer Class, to meet the demand. It has its own training centre at the company's headquarters in Poole, but will hold courses on companies' own premises.

Kelator's plans are not so far advanced. Mike Howieson, who used to co-ordinate training at Acorn, is in the process of setting up courses. Initially these will be aimed at improving the knowledge of the dealers who supply Acorn equipment through Kelator, but Howieson stresses: 'We will provide hardware and software training to any corporate client who needs it or to any other interested organisation.'

Acorn recently held its first weekend dealer conference. The latest applications for the Archimedes were demonstrated and there were seminars on such topics as hardware expansion for the Archimedes.

The sharper image

If your laser printer conforms to the Hewlett Packard Laserjet standard, a new typesetting program from Mijas Software could improve output. Text can be imported from any wordprocessor and printed out in one of the proportionally spaced fonts available on cartridge. The program costs £20.

■ Two new laser printers will help to make this technology more affordable. Intelligent Interfaces are distributing the Olympia Laserstar 6 which will cost £1492.70. Mannesmann Tally, Europe's largest producer of printers, has launched the MT905 at £1395. Both printers support the Diablo and Hewlett Packard Laserjet II standards.



Mannesmann Tally's MT905

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305 Colour	1054.60	87.92
310	958.24	79.87
310 Mono	1027.00	85.62
310 Colour	1211.00	100.88
310M	1027.00	85.62
310M Mono	1096.00	91.37
310M Colour	1280.00	106.74
440	2906.10	242.23
440 Colour	3159.10	263.35

Featuring Risc OS

The exciting new multi-tasking operating system for Archimedes, RISC OS, will be available early in 1989. Purchase an Archimedes under this scheme and you will be one of the first in the country to receive RISC OS, as soon as it becomes available. Your copy will be sent to you to install, or if you prefer, we will install it for you free of charge.

24 or 36 Months Credit and Trade ins

Should you prefer, we are also able to offer credit over 24 or 36 months at 13.75% flat rate (typical APR 27.5%). We are also able to offer up to £225 for your old BBC computer. Please ask for details.

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Introducing View to students

ESM has released a range of packs to help teachers and students become familiar with the *View* wordprocessor, spreadsheet and database.

The three packages in the *An Introduction to . . .* series are supplied in sets of five student workbooks at £17.50 each. The materials were developed by Hampshire TVEI Centre and are suitable for GCSE, TVEI, RSA and Pitman Information Technology and Business courses.

A disc covering all three packages is available for £5.

And ESM has released a Concept Keyboard version of the ever-popular *Podd.* A set of 52 photocopiable activity cards costs £12.50.

Two new Anita Straker adventures, always a popular feature of ESM's list, are now available — *Puff* (£16.95) and *Martello Tower* (£16.95). Both provide challenging logical and mathematical problems for children in the 8-10 years age group.

New from Sherston

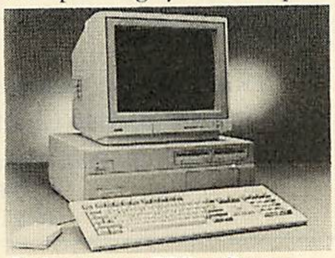
Sherston Software will be demonstrating their latest releases at the BETT 89 show and will be repeating their free approval service, so that visitors may take software away for inspection.

MapVenture is a geography/map skills package for top juniors and lower secondary pupils. *The Micro Bugs* is an educational adventure by Simon Hosler and *The Teddy Bears' Picnic* is a topic-based package continuing Sherston's tradition of materials for younger children.

Sherston Software, Swan Barton, Malmesbury, Wilts.

Amiga follows Mac down Beeb path

Commodore is set to follow Research Machines and Apple in releasing BBC Basic and a model B emulator for its machines to improve their appeal to schools. Acorn has also upgraded its BBC emulator for the Archimedes, now called *65Host,* which will come with the RISC OS upgrade to the operating system in April.



Amiga: to run BBC software

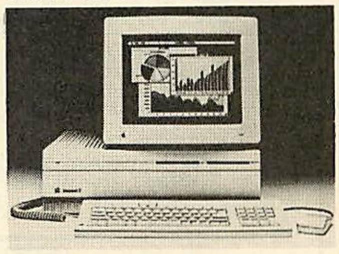
Software is being written for the Amiga so it can run BBC programs which are compatible with the second processor, and plans to add on the ability to read Acorn DFS format discs.

The BBC Basic is written in 68000 code, and the emulator is clever in that it uses this when it comes across Basic in a program, thus speeding things up. Multitasking can be achieved with up to three copies of the emulator running at the same time under the Amiga desktop.

A version demonstrated to *Acorn User* looked about the same level as the emulator originally supplied with the Arc, and accepts most operating system 'star' commands. It is expected to cost about £50 and should be available in the spring.

And Apple has released a document outlining its strategy called 'Connectivity for Education'. This details developments outlined in November's issue for BBC Basic, transferring application files, and other projects.

New products include an AppleTalk to Econet link, and an interface box from Resource to mimic the BBC's User Port. This means that devices such as the Concept Keyboard and robotics kits can be used with the Mac.



Mac: to get User Port

The Resource Controller is almost a BBC in a box with its own processor, interface chips and memory.

All these products can be seen at the BETT Show in January. Commodore, The Switchback, Gardner Rd, Maidenhead, Berks SL6 7XA. Apple, Education Information, Freepost Apple, Eastman Way, Hemel Hempstead, Herts HP2 4BR.

Your best BETT

BETT 89, to be held at the Barbican Exhibition Centre in London from January 18 to 21, is set to provide visitors with even more for their money this year.

Following the success of seminar sessions last year, the whole range of lectures and discussions is now open to all visitors. The Wednesday sessions will deal with management issues including Local Finance Management (LFM) and the profiling of students. On Thursday, curriculum matters will be aired and on Friday, training in higher education will be examined. To enrol in the seminar sessions, contact EMAP Exhibitions. Delegates may also enrol at the door on the day if there are any free places.

The exhibition is expected to host visitors from 14 countries — plenty of export potential for hardware and software manufacturers.

Winners of the 1988 Education Technology Awards will be announced during the four days of the exhibition.

The exhibition is free to teachers and details are available from EMAP Exhibitions, 12 Bedford Row, London WC1R 4DU.

Software list

Teachers interested in rediscovering the freely-copiable *Blue File* Software that was made available throughout MEP will soon be able to obtain copies from MESU/NCET in Coventry. The list of titles which were dispersed around the country after the demise of MEP is to be consolidated by MESU and should be available from February.

Special Needs materials are still available from the Special Needs Software Unit, Manchester Polytechnic, Hathersage Rd, Manchester M13 0JA.

MESU, Science Park, University of Warwick, Coventry.

Computer survey

Acorn User is conducting a survey of the use to which computers are being put in our schools and colleges. The results are likely to be of interest not only to our readers but also to hardware manufacturers and software publishers. Please help us to obtain a broad perspective of educational computing by completing the survey. If you wish to preserve your magazine then simply photocopy the questionnaire. Pass on copies to colleagues who want to contribute.

Throughout the questionnaire please tick the relevant box or add further details where a line indicates the need for additional information.

Thank you in advance for your help!

YOUR SCHOOL OR COLLEGE

1. In which type of institution do you work?

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☐ Junior/Middle school
☐ Secondary school 11(12)-16
☐ Secondary school 11(12)-18
☐ Sixth form college
☐ FE college
☐ HE college
☐ University
☐ Other__________

2. Number of students__________

3. Number of teaching staff__________

4. Which types of computers are there in your establishment, and how many?

☐ Acorn
☐ Research Machines
☐ Apple
☐ Commodore
☐ Atari
☐ IBM/clones
☐ Other__________

5. Does your institution run a network?

☐ Yes
☐ No

YOUR SOFTWARE

6. Place the following in order of most frequent use:

☐ Wordprocessing
☐ Database
☐ Spreadsheet
☐ Graphics/Art/Design
☐ Desktop publishing
☐ Other__________

7. Of which software publisher's products have you purchased the most copies in the past two years?

____

____

8. For IT co-ordinators only: of the software you have purchased, please indicate rought percentages, first for subject areas, and secondly software types:

☐ Humanities
☐ Languages (inc. English)
☐ Business Studies/Economics
☐ CDT/Art
☐ Music/Performing arts
☐ Maths
☐ Science
☐ Administration
☐ Computer Studies
☐ Other__________

☐ Generic productivity tools
☐ Simulations
☐ Teaching programs (drill & practice)
☐ Revision software
☐ Problem-solving/Adventure
☐ Control/Sensing/Monitoring software
☐ Computer languages/utilities

9. How many software packages do you have available?

____

____

10. Please estimate how many of these you use:

Frequently ______
Occasionally ______
Rarely ______

16/32-BIT SYSTEMS

11. From the range of software available for the new 16/32-bit machines (Archimedes, Nimbus, Macintosh etc) which specific software packages will have most impact *educationally* in your institution?

____

____

12. If you had £2000 to spend, would you buy:

☐ 8 Cambridge Computer Z88s
☐ 3 BBC Masters with disc drive and colour monitors
☐ 2 Archimedes with colour monitor
☐ Other (please specify)__________

13. Do you see your present computer resources being replaced by 16/32-bit machines in the next few years? If so, on which computer will you standardise?

____

____

14. If not, into which curriculum areas would you target 16/32-bit machines that you do receive?

☐ Humanities
☐ Languages (inc English)
☐ Business studies/economics
☐ CDT/Art
☐ Music/Performing arts
☐ Maths
☐ Science
☐ Administration
☐ Other__________

Send your completed questionnaire to Education News, BBC Acorn User, 20-26 Brunswick Place, London N1 6DJ before February 28 1989.



Crisp Printing

Now here's some food for thought ... The Micro P. range of dot matrix printers offers crisp printing performance at unbelievably competitive prices and is ideal for cost conscious users with a real appetite for work.

There is a whole range to choose from to suit all tastes, ranging from the snappy 135cps MP135+, the 240cps MP200+, pictured above, with optional font cards, through to the gluttonous line printer, the 700cps MP700.

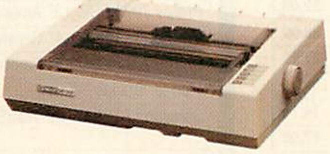
Whilst we won't promise to include a little blue bag of salt, the Micro P. range of printers will produce some very appetising printout, at prices any user will relish!

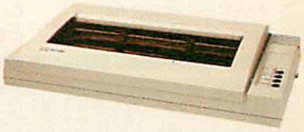
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MP135+
A low cost high performance printer using latest technology to produce print that makes draft quality look like NLQ.
Speed: 135 cps draft, 27 NLQ.
Columns: 80
Compatibility: IBM/Epson
Price: £125 RRP

MP165+
This new styled NLQ printer offers the user the very best in low cost matrix printing.
Speed: 190cps draft, 32cps NLQ.
Columns: 80
Compatibility: IBM/Epson.
Price: £189 RRP

MP200+
This 80 column, 40cps, NLQ printer offers the best value in the market place. You can't buy better. A range of font cards are available.
Speed: 240cps draft, 40cps NLQ. **Columns:** 80.
Compatibility: IBM/Epson.
Price: £299 RRP

MP480
This fast, high performance line printer is a unique buy, which combined with its outstanding capabilities makes it a real winner.
Speed: 480cps **draft,**74cps NLQ **Columns:** 80.
Compatibility: IBM/Epson.
Price: £329 RRP

MP700
This top of the range new styled line printer offers exceptional value for money and is well established in todays printer market.
Speed: 700cps/252 lines per minute.
Columns: 136.
Compatibility: IBM/Epson.
Price: £419 RRP

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Technology goes on the buses

BBC Soft's *Technology and Design* package is a multi-media set of materials to help develop design topics in CDT classes in top junior through to upper secondary classes. The original was reviewed in *Acorn User* and now *Part 2* has been released for £21.70 plus VAT.

The new materials build on the first pack, but are totally software based. Three programs deal with the management and timetabling of a bus company in a large town; the principles of sorting and selecting; and the design of packaging.

In *The Bus Game,* each turn represents one month's trading and during that time the player must design routes and services to improve the trading position. Data for the simulation was supplied by the Transport and Road Research Laboratory.

Adventure of Sorts uses real data about students to tackle obstacles in an adventure. So, for instance the slimmer members of the class may squeeze through narrow tunnels while the more athletic are able to jump over chasms!

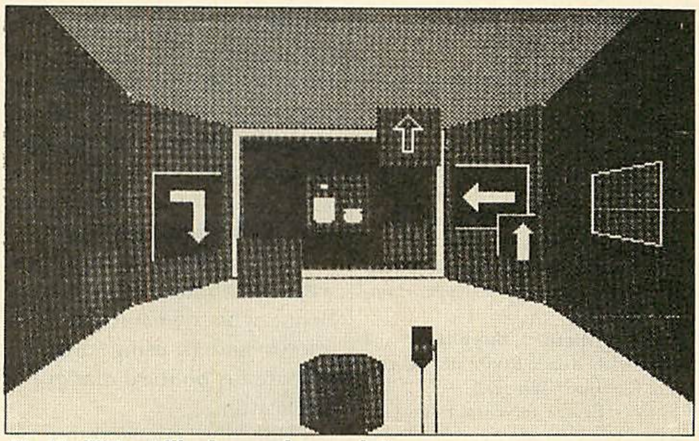
The software includes a data sorter which allows pupils to catagorise members of the class according to various physical characteristics and choose the most appropriate members for the adventure. Curriculum materials are provided to help the teacher organise the use of the software in a number of different circumstances.

Pack-It, involves choosing materials, design, and minimising wastage to keep production costs low. Another element is stacking the design, calling for an understanding of tessellation of different shapes.

Screen dumping made simple

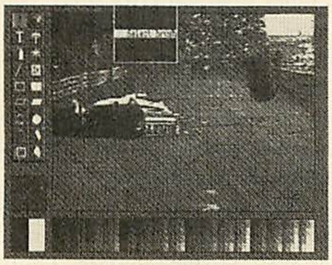
Teachers and students often need printed copies of screens from the software they are running. ESM's *Screenprint* is possibly the simplest and most straightforward means of obtaining an immediate hard copy of a particular screen.

The new colour version of the ROM allows programs to be interrupted at any time, and the screen dumped to a black and white Epson-compatible printer or to one of two types of colour device. *Screenprint* is always available, unless disabled with a star command. Its four simple commands can be included in your programs to obtain the same effect, and it works on the BBC model B, B+, Master 128 and Compact.

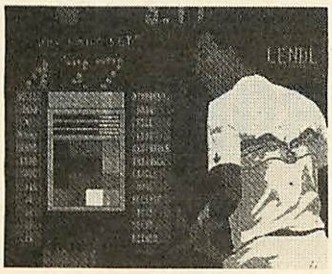


Worlds Without Words saved on an Integrex

Two versions are available, one for colour inkjet printers (Integrex and Canon) the other for colour dot-matrix printers (Juki, Star and Epson JX compatible). Each version is identical in use to the monochrome original, and each supports black and white printers in the same way as the original ROM. Although it is not as versatile as *Snatch* from 4Mation, *Colour Screenprint* scores by being so simple to use and not needing sideways RAM. **Chris Drage**



Pax above, Leonardo below



Cut-price Arc Art

Of the dozen art packages for the Archimedes, two, *Pax* and *Leonardo,* are relatively cheap.

The £15.95 *Pax* from Z&Z Software was written by Julian Rockey (of *Quazar* fame). It works in mode 15 (640 by 256 pixels with 256 colours) with the actual drawing screen 'clipped' in a window.

Any graphics screen can be imported using an automatic conversion routine.

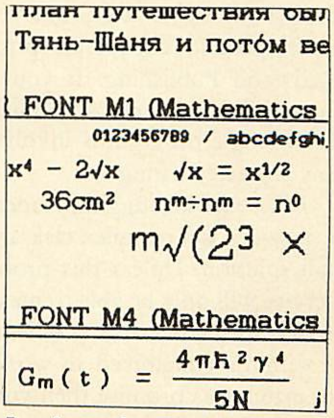
The usual draw commands are available, plus three others: Rotate allows a rectangular area to be copied and rotated; Distort stretches a rectangle into any quadrilateral; Squeeze maps an area into a circle.

Leonardo works in mode 12 (640 by 256 with 16 colours). It has some nice features such as five levels of magnification. Importantly, all the drawing features will work at any level, so you can spray very small areas, or draw tiny circles etc. The other features are pretty standard at £17.50.

Power for font users

Wordpower is a BBC word-processor, which has been continually developed over the past two years. It has built up quite a following in education circles, mainly because it will run on virtually every kind of Acorn equipment from Electron to Archimedes.

The latest version number four offers a major new feature called 'Power fonts' where 11 add on packs each offer at least seven different languages for £19. As well as the normal French, German and Spanish the vast array includes Albanian, Czech and Ukranian. Three others provide maths, physics, or chemistry symbols. Multi-line statistical equations are of tremendous quality on screen and on paper. Excellent value at £36.



Russian and maths samples

Contacts

Ace Computing, 27 Victoria Road, Cambridge CB4 3BW.
BBC Soft, 80 Wood Lane, London W12 0TT.
Beard Technology, 111 Evering Road, London N16 7SL.
Beebug, Dolphin Place, Holywell Hill, St. Albans, Herts AL1 1EX.
CDS, Unit 17, Chapman Way, Tunbridge Wells, Kent TN2 3EF.
Centre for World Development Education, Regent's College, London NW1 4NS.
Clares Micro Supplies, 98 Middlewich Road, Rudheath, Northwich, Cheshire CW9 7DA.
ESM, 32 Bridge St, Cambridge CB2 1UJ.
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Ground Control, 4 Alfreda Avenue, Hullbridge, Hackley, Essex SS5 6LT.
Mijas Software, Winchester Road, Micheldever, Winchester, Hants SO21 3DG.
David Pilling, PO Box 22, Thornton Cleveleys, Blackpool FY5 1LR.
Watford Electronics, Jessa House, 250 Lower High Street, Watford WD1 2AN.
Z & Z Software, Brecklands, Broad Oak, Shrewsbury, Shropshire SY4 3AH.

Not on the net

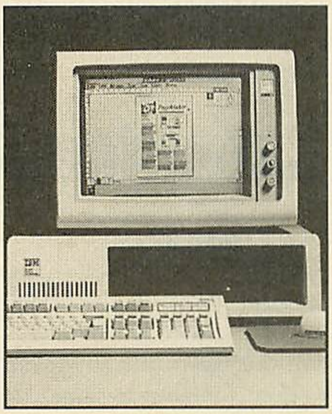
Now that Micronet has abandoned paid-for downloadable software, *AU's* program listings are no longer available on Micronet. Your only alternative to typing them in yourself is to buy our monthly listings disc – see page 115.

In next month's issue

February's issue majors on connectivity – linking the BBC micro to other types of computer. In particular, David Atherton shows how files can be exchanged with IBM PCs, with Macintoshes and even with mainframe computers.

Plus there's an interview with ex-Cabinet Minister Tony Benn, who owns seven BBC micros and is using them to prepare his political diaries for publication.

Education concentrates on spreadsheets – Chris Drage and Nick Evans discuss what they are and how they can be used in schools. And will mathematics teaching be transformed by *Numerator,* new software from Logotron reviewed by Martin Phillips?



Transfer BBC data to an IBM PC



Swap files with a Macintosh

Reviews include the latest in printing technology – the Qume CrystalJet and Hewlett Packard's DeskJet – two machines that aim to give you laser quality at half the price. Malcolm Brown says whether they succeed. And Rob Wilmott looks at the latest professional-quality circuit board design software for the Arc.

We also look at Acorn's plans for RISC OS and Unix, as well as the regulars: Hints and Tips, Arc Agora, the DTP page and Music Column.

BLUNDERBOX

Last month's Top Hundred feature used a screenshot of *InterWord,* Computer Concept's *other* successful wordprocessor, instead of *Wordwise.*

■ October's Top of the List to produce double-height and double-width text was missed off the contents page. The listing can be used either as a stand alone utility or combined with Joe's Ideas Processor to speed up some of the display routines. The listing and instructions for adding the routines to Joe's program appeared on page 94.

Diary dates

December 11. SATRO North Scotland Computer & Technology Show, Music Hall, Aberdeen. Dr Lesley Glasser, SATRO North Scotland, University of Aberdeen. (0224) 273161.

December 12-15. Which Computer? Show, National Exhibition Centre, Birmingham. Cahners Exhbitions, 01-891 5051.

December 18-21. British Education & Training Halls, Golden Lane, London, EC4. EMAP Exhibitions, 12 Bedford Row, London WC1. 01-404 4844.

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PC1640SD	Colour	599.00
PC1640DD	Colour	699.00
PC1640HD20	Colour	959.00
PC1640S	Enhanced Colour	739.00
	Enhanced Colour	839.00
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PCW 9512		449.00
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ACORN Archimedes

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	Colour	899.00
A310M	Base	759.00
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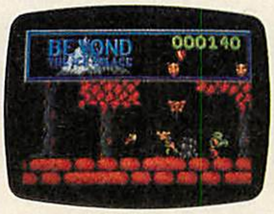
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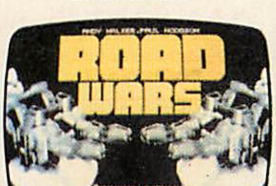


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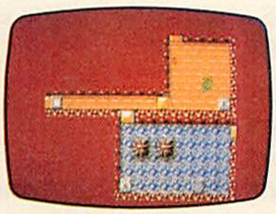
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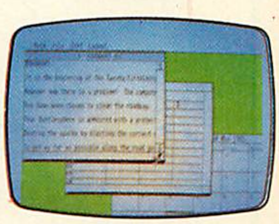
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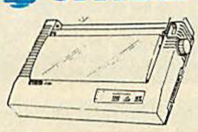
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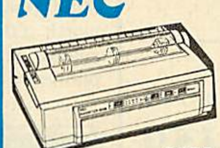
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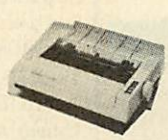
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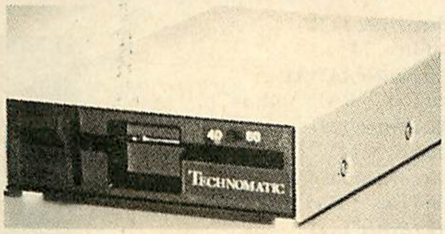
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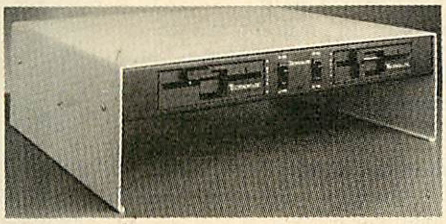
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3.5" 80T DS Drives:

TS351 single 400K/640K	**£69(b)**
PS351 3.5" single drive with integral mains power supply in a 5.25" case.	**£95(b)**
TD352 Dual 800K/1280K	**£126(b)**
PD352 3.5" dual drive with integral mains power supply in a 5.25" case.	**£139(b)**

Combo Drives (5.25" & 3.5" drives)

PD853 with integral psu	**£180(a)**
PD853P with integral psu	**£205(a)**

DISC DRIVE MULTIPLEXER
For Master, B, B+ and any DFS/ADFS

TDM2 Two computers/one drive unit	**£65(b)**
TDM4 Four computers/one drive unit	**£115(b)**

TECHNOMATIC WINCHESTERS

Technomatic offer the most popular range of Winchester drives for the BBC Micro drives at competitive prices. The drives are fully compatible with Acorn ADFS system on BBC Master, models B and B+.

The single winchester drive cased in attractively styled metal enclosure of BBC matching beige are fan cooled and powered by switch mode power supply for quiet, efficient and reliable operation. Combination of floppy and winchester drives in our elegant plinth housing provides an ideal solution to space saving and ease of transferring data between floppies and winchester.

To enable the user, whether a novice or a professional obtain the most from the Winchester we include as standard the following utilities:

★ TREE PLAN: a utility to create an organised directory structure, display the structure on the screen and/or dump it to a printer.
★ Winchester formatter and verify program.
★ Help utility to transfer ADFS utilities from Master Welcome disc or ADFS utils disc.
★ Archiving routine to backup critical data onto floppies.
★ Copying DFS files to Winchester.

Additionally for the Master users, we also include the popular front end utility at no extra cost to provide an easy and efficient file management system. The entire contents of the drive are displayed on the screen on boot up, each file or directory appearing as an icon. The icon type indicates whether a directory or a file and type of data if latter. File can be loaded simply by pointing at the icon. Time and date are also displayed.

P30HD 30 Mb Winchester	**£420(a)**
P404HP 30 Mb Winchester with 40/80T switchable 640K double sided floppy drive in plinth format	**£609(a)**
P60HD 60 Mb Winchester	**£575(a)**
P604HP 60Mb Winchester with 40/80T switchable 640K double sided floppy drive in plinth format	**£769(a)**

MASTER COMPACT

128K RAM, 640K 3.5" DS Drive + Educ software and our bundled Educ/Fun package included

SYSTEM 1 Entry System	**£310(a)**
SYSTEM 2 with 12" Mono Monitor	**£365(2×a)**
SYSTEM 3 with 14" Col Monitor	**£475(2×a)**

2nd Drive Kit	**£90(c)**	Serial Kit	**£25(d)**
Mertec Adaptor	**£35(c)**	TV Modulator	**£26(d)**
Ext Drive Adaptor	**£9(d)**	Printer Lead	**£7(d)**

UPGRADE KITS

1.20S ROM	£15(d)	ADFS ROM	£26(d)
DNFS ROM	£19(d)	1770 DFS Kit	£49(d)
BASIC II ROM	£22.50(d)	Econet Kit	£55(d)

RAM/ROM EXPANSION

ATPL Board for Model B. Simple to instal, no soldering. Allows expansion to 15 Roms +2*8K RAMS	**£37(c)**
ATPL Battery backup kit	**£18(d)**
ATPL Board for BBC+ (10 Roms)	**£31(c)**

3M FLOPPY DISCS

5.25" Discs in packs of 10

744 40T SS DD	**£6.50(d)**
745 40T DS DD	**£8.00(d)**
746 80T SS DD	**£12.00(d)**
747 80T DS DD	**£11.00(d)**

3.5" Discs in packs of 10

80T SS DD	**£13.50(d)**
80T DS DD	**£15.00(d)**

(Add £1 for library case packing)

BULK DISCS

50 5.25" 40 T single sided discs with sleeves in lockable box.	**£25(b)**
50 5.25" 80 T double sided discs with sleeves in lockable box.	**£32(b)**
50 3.5" 80T double sided discs with sleeves in lockable box.	**£60(b)**

FLOPPICLENE DRIVE HEAD CLEANING KIT

5.25" Kit with 20 disposable discs	**£14.00(d)**
3.5" Kit with 20 disposable discs	**£14.75(d)**

DISC STORAGE BOXES

DB340 Lockable 40 × 3.5"	**£8.50(c)**
DB550 Lockable 50 × 5.25"	**£6.50(c)**
DB570 Lockable 70 × 5.25"	**£8.50(c)**
DB5100 Lockable 100 × 5.25"	**£10.50(c)**

EPROMS/RAMS

2764-25	**£2.80**	27256-25	**£6**
27128-25 (12.5vVpp)	**£4.50**	27128-25 (21vVpp)	**£6**
27512-25	**£9**	6264LP-15	**£6**

These prices subject to change (Carriage code d)

All prices ex VAT and subject to change without notice. See page 5 for Carriage Charges.

TECHNOMATIC

305 Edgware Road, London W2 Tel: 01-723 0233

PRINTERS

EPSON

LX800	£179(a)	**LQ500**	£275(a)
FX800	£309(a)	**LQ850**	£439(a)
FX1000	£419(a)	**LQ1050**	£599(a)
EX800	£429(a)	**LQ2550+**	£1049(a)
EX1000	£579(c)		

GQ3500 Laser Printer £1249(a)

Taxan KP815 £159(a) **Taxan KP915** £275(a)

Star LC10 £189(a)
Star LC10 Colour £249(a)
Star LC24-10 £309(a)

NATIONAL PANASONIC
KXP1081* £145(a) **KXP1082*** £172(a)
(*includes Wysiwyg ROM + Master Lead)

KXP3131 with 38K buffer £245(a)
Canon PW1080A £149(a)
Canon Laser LBP8-II £1595(a)
Brother HR20 Daisy Wheel £349(a)
Juki 6100 Daisy Wheel £295(a)
Integrex Colour Inkjet £529(a)

PLOTTERS

Hitachi 672XD A3 4 Colour HPGL £499(a)
Plotmate A4S £379(a)
Plotmate A3M £549(a)
Roland 880 A3 Flat bed 8 col £599(a)
Variety of Plotter pens and accessories in stock.
Larger Plotters available. Please enquire.

EPSON LQ500

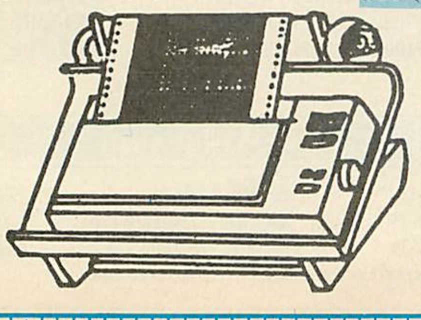
Epson's budget 24pin letter quality printer provides unrivalled print quality with two built in letter quality fonts and widest repertoire of type styles at low cost. Sans Serif and Roman or draft font can be selected from the front panel. Maximum resolution of 360 × 180 dpi. Friction and tractor as standard. Parallel interface. Designed for low noise operation 55dB(A).
Introductory price incl. master lead £275(a)

EPSON LX800

Epson's latest budget printer offers a host of new features all utilising Epson's unrivalled knowhow of printer technology and reliability.
★ 180cps draft/25cps NLQ ★ two modern fonts as std: Sans Serif and ROMAN. NLQ font selection from front panel ★ Tractor and friction feed ★ Single sheet guide with auto load switch. Original + 2 copies.
★ 3K input buffer with character downloading facility
★ Fully compatible with BBC & IBM graphics
★ Centronics interface as standard
★ Price including BBC master lead £179(a)

PRINTER STAND

A new style printer stand with easy paper feed and paper seperation, provides complete access to paper. Can be used with both top and bottom paper feed. Very space efficient. £26 (b)



PRINTER BUFFERS SHARER & CONVERTERS

TSB 256 Auto Sharer/Buffer
256K buffer with 3 input ports. Each port scanned automatically every 10 secs until data found. PAUSE, COPY and RESET Facitilies. Full spec on request. £169(a)

Smart Printer Buffers
Facilities include: COPY upto 265 copies PAUSE, RESET, Self-Test.
For serial: X-on/X-off, ETX/ACK or DTR/DTS protocols independently selectable baud rate for each port
PP256 256K Parallel buffer £169(b)
SS256 256K Serial buffer £189(b)

Parallel Multi-Spoolers
Allows connecting 2 printers to 2 or 4 computers
Butter allows quick dumping of data to free the computers
COPY allows upto 999 copies, SELF-TEST, PAUSE, CLEAR
MS422 4computers/2printers 512K buffer £299(b)
MS223 2computers/2 printers 512K butter £199(b)

Compact Two Way Switch 2 computers to 1 printer or 2 printers to 1 computer Attaches to the side of a computer or a printer £23(c)



Serial/Parallel/Serial Converters
Compact economical converters which support X-on/X-off, ETX/ACK, DTR/DSR protocols
C-PS Parallel/Serial converter £35(c)
C-SP Serial Parallel converter £35(c)
Add £49 to above prices for units with 64K butter

Manual Printer Sharers:

(All lines are switched).	Parallel	Serial
2 computers to one printer	£25(c)	£25(c)
3 computers to one printer	£39(c)	£39(c)
4 computers to one printer	£45(c)	£45(c)
2 computers to 1 or 2 printers	£49(c)	£49(c)

Cable sets for above sharers available for all popular computers

BBC Computer Sharer: TCS26
1 computer to 2 printers fitted with BBC cable £21(c)

Paper & Labels
Plain fanfold paper with microperforation:
2000 sheets 9½ × 11″ £12(£3.50)
2000 sheets 14½ × 11″ £18.50(£4.50)
1500 sheets A4 90gsm £18.00(£4.00)

Labels/1000
Single Row 3½″ × 1⁷⁄₁₆″ (d) Triple Row 2⁷⁄₁₆″ × ⁷⁄₁₆″ £5(d)
OHP Transparencies A4 (100) £56(b)

PARALLEL PRINTER LEADS
BBC/Master (1.2m) £5(d) BBC/Master (2m) £7(d)
Archimedes (2m) £7(d) Compact (1.2m) £7(fd)

MODEMS

MIRACLE WS4000 V21/23 £129(b)
MIRACLE WS3000 V21/23 £244(b)
MIRACLE WS3000 V22 £379(b)
MIRACLE WS3000 V22 bis £495(b)
Pace Linnet £139(b)
(All modems are BABT approved)
BBC Data Cable for WS3000/4000 £10(d)
MIRACLE WS2000V21/23 & BELL stds £92(c)

MONITORS

12″, 14″ and 20″ MONITORS

Microvitec 1431
Std Res, 14″ £179(a)
Microvitec 1431AP
Std Res + PAL/Aud, 14″ £199(a)
Microvitec 1451
Med Res, 14″ £225(a)
Microvitec 1451AP
Med Res + PAL/Aud, 14″ £255(a)
Microvitec 1441
Hi Res, 14″ £359(a)

Philips 8833 14″ RGB
Med Res, 14″, high contract screen, TTL/Linear input, Mono/Colour Switch Stereo Sound Input. Separate controls for brilliance and contrast. £219(a)

Microvitec 2030CS
20″ Standard Resolution RGB/Comp Video £380(a)
Microvitec 2040CS
20″ High Resolution RGB/Comp Video £675(a)
TAXAN SUPER VISION 620
12″ Hi Res/Hi Contrast Option to switch to green/amber BBC/IBM Compatible £269(a)
TAXAN SUPER VISION 625
12″ Super Hi Res and contrast RGB Monitor with option to switch to mono BBC/IBM compatible. £319(a)
TAXAN 770+
MultiSysnc Autoscan 14″, ideal for utilising the hi res modes on Archimedes. Our price includes a tilt & swivel stand £485(a)
NEC MultiSync II 14″
Enhanced version of the original NEC MultiSync. complete with tilt & swivel base. Suitable for Archimedes and PC compatibles. £479(a)

MONOCHROME MONITORS

PHILIPS 7752 NEW
14″ green screen monitor.
This is a new addition to the Philips' popular mono monitors. Features include Flat screen, Inverse video switch, separate brilliance and contrast controls. £85(a)
PHILIPS BM 7502
Hi Res green screen £72(a)
PHILIPS BM 7522
Hi Res amber screen £79(a)
Tilt & Swivel Stand for Philips Mono £6(c)

MONITOR ACCESSORIES

Microvitec Swivel Base (14″ plastic monitors) £17(c)
Monitor Stand Models B & B+ £10(c)
Monitor Stand Master £13(c)
Double Tier Stand Models B, B+ or Master £24(b)
Taxan RGB Lead £7(d)
Microvitec Lead £4(d)
Monochrome BNC/Phono Lead £4(d)
Copy Holder Self Supporting A4 £15(c)
New general purpose tilt and swivel stand for 12″ and 14″ Monitors £15(c)

TECHNOMATIC

Techno House 468 Church Lane, London NW9 8TQ. Tel: 01-205 9558 Fax: 01-205 0190

CAD/DRAWING PACKAGES

NOVACAD Cad Package for B, B & MASTER. (See page 5 for specification)	
Tracker Ball/Mouse Version (TM)	£49 (d)
TM Version plus Tracker Ball	£94 (d)
TM Version plus Mouse	£79 (d)
Plotter Driver Generator	£15 (d)
If purchased with Novacad	£12 (d)
MOUSE	
AMX MOUSE with SUPER ART (pse specify B, B+ or Master)	£59 (d)
STOP PRESS (Pagemaker)	£32 (d)
EXTRA/EXTRA (utility for the Pagemaker)	£19(d)
MAX	£17 (d)
STAND ALONE MOUSE	£34 (c)
RB2 TRACKER BALL	
RB2 Tracker Ball with Icon Master (for B, B+ & Master)	£59 (c)
RB2 Tracker Ball with Cursor Control Rom (for Master only)	£59 (c)
RB2 Tracker Ball 'Stand Alone' for use with NOVACAD & other software)	£47 (c)
Cursor Control Rom for Master	£12.50 (d)
MIRRORSOFT FLEET STREET EDITOR	£35 (d)

TIME WARP

Real Time Clock, Plugs into the user port, battery back up as standard, includes manual, demo software including a diary/planner application program — £29(d)

BBC SOFT/FIRMWARE

DATABASE MANAGEMENT SYSTEMS

VIEWSTORE	£36 (d)
STARdataBASE	£39 (d)
MASTERFILE II	£17 (d)
ACORN OVERVIEW PACKAGE Special Offer (RRP £86)	£69 (b)
INTERBASE	£49 (d)

WORD PROCESSORS

ACORN VIEW PROFESSIONAL (BBC)	£69 (c)
VIEW 2.1	£35 (d)
VIEW 3.0	£45 (c)
Double View Rom Version	£42 (d)
Double View Disc Version (for Master & Compact)	£33 (d)
VIEW INDEX	£12 (d)
VIEW PRINTER DRIVER GENERATOR	£8 (d)
VIEWSPELL	£29 (d)
DOT PRINT PLUS	£28 (d)
WORDWISE	£24 (d)
WORDWISE PLUS	£38 (d)
WYSIWYG PLUS	£21 (d)
SPELLMASTER	£42 (d)
INTERWORD	£36 (d)
WORDEASE	£24 (d)
SPELLCHECK III	£31 (d)
EDWORD II	£43 (c)

SPREADSHEETS

VIEWSHEET	£36 (d)
WINDOMATIC (A Viewsheet Utility)	£15 (d)
VIEWPLOT	£22 (d)
INTERSHEET	£37 (d)
INTERCHART	£25 (d)
ULTRACALC	£26 (d)
MINI OFFICE II DISC Version	
For B & B+ 40T or 80T	£14 (d)
For Master 80T	£16 (d)
For Compact	£19 (d)
MINI OFFICE II ROM Version	
For Master, Compact, B+ & B	£43 (c)
MEGA 3Rom	£76 (b)

CC's integrated package offering Interword, Intersheet & Interchart on one 128K ROM. For Master, Compact, B+ & B

LANGUAGES

META ASSEMBLER	£145 (b)
TEAM DISASSEMBLER	£145 (b)
MACROM	£33 (d)
ACORNSOFT 'C'	£40 (c)
ACORN MICRO PROLOG	£62 (d)
ISO-PASCAL	£51 (c)
ISO-PASCAL STAND ALONE GENERATOR	£30 (d)
OXFORD PASCAL (40 or 80T) Specify B or B+	£36 (d)
OXFORD PASCAL for Master	£52 (d)
ACORN LOGO	£46 (c)
LOGOTRON LOGO	£55 (c)
BBC PUBLICATIONS OPEN LOGO	£59 (c)
ACORN LISP ROM	£39 (d)
ACORN FORTH ROM	£39 (d)
ACORN COMAL ROM	£39 (d)
Advanced BASIC Disc (for B, B+ & Master + 6502 2nd Processor)	£26 (d)
MICROTEXT	£52 (c)
MICROTEXT PLUS	£229 (b)

COMMUNICATIONS

TERMULATOR	£25 (d)
COMMSTAR II	£28 (d)
MAYA Comms Package See next page for details NEW	£49 (d)
MODEM MASTER	£11 (d)
COMMAND	£34 (d)
MASTER TERMULATOR	£34.75 (d)

UTILITIES

ACORN ADFS ROM	£26 (d)
ACORN BASIC EDITOR	£24 (d)
MONITOR (BBC Pub)	£19 (d)
SLEUTH	£23 (d)
TOOLKIT PLUS	£31 (d)
TOOLBOX 2 (BBC Pub) Manual / Cassette	£9.50 (d) / £9 (d)
ACORN GXR GRAPHICS ROM specify B or B+	£24(d)
PRINTMASTER	£24 (d)
PRINTWISE	£24 (d)
DUMPMASTER	£26 (d)
FONTWISE PLUS	£17 (d)
ADV TELETEXT UTILITIES ROM	£7.95 (d)

COMPACT (all on 3½" disc)

ARTROOM	£27 (d)
FONTWISE+	£22 (d)
FONT EDITOR	£22 (d)
BETABASE	£27 (d)
WHITE KNIGHT MKII	£16 (d)

BBC PUBLICATIONS EDUCATIONAL SOFTWARE

A series of programs developed in many cases alongside Radio & TV programmes by BBC's Education Department which supplement the classroom studies by moving and colourful displays helping in clear understanding of a variety of subjects. Some packages also include audio cassettes.

PRIMARY EDUCATION

ASTRONOMY	£11 (d)
COMPUTERS AT WORK	Aud/EC/disc£16 (c)
PICTURE CRAFT	Disc£17 (d)
INTRODUCING GEOGRAPHY	Disc£16 (d)
MATHS WITH A STORY 1	Cass£8 (d)
MATHS WITH A STORY 2	Cass£8 (d)
NUMBER GAMES	Cass/EC£7.50 (d)
USING YOUR COMPUTER	Cass£24 (c)
THE HALL OF MIRRORS	Disc£13 (d)
MATHS	Disc+AudCas£17(d)

SECONDARY LEARNING

TECHNOLOGY & DESIGN Pt1	£21.50 (c)
ELECTRIC FIELDS	£10.50 (d)
ADVANCED LEVEL STUDIES: STATISITICS	Disc£23 (d)
ADVANCED STUDIES: GEOGRAPHY	Disc£17 (d)
INSIDE INFORMATION	Prog Cass£10 (d) / Book£8 (d) / Audio Cass£5 (d)
OPEN LEARNING PACK	Disc/AudCas+book£36(b)
SCIENCE TOPICS (ST)	
S.T.:WAVES	Disc£14 (d)
S.T.:RELATIONSHIPS	Disc£14 (d)
S.T.:BONDING	Disc£14 (d)
S.T.:ELECTROMAGNETIC SPECTRUM	
S.T.:ELECTRONICS IN ACTION	Disc£14
S.T.:NEWTON & THE SHUTTLE	Disc£19
S.T.:ECOLOGY	Disc/EC£19
S.T.:POLYMERS	Disc/EC£19 (d)
S.T.:CLASSIFICATION & PERIODIC TABLE	Disc£20 (d)
S.T.:FOOD & POPULATION	Disc£20 (d)
SEC.SCIENCE MICROTECHNOLOGY	Cass£7 (d)
SEC.SCIENCE:THE MOLE CONCEPT	Disc/Aud/EC£16 (c)
BIRD SPY	Disc£13 (d)
GEORDIE Racer	Disc£13 (d)

GENERAL

VU-TYPE PROFESSIONAL	Disc£19 (d)
WHITE KNIGHT MK II (for 1770 DFS)	Disc£16 (d)
BATTLEFIELDS	Cass£8.50 (d)
A VOUS LA FRANCE	Disc£20 (d) / Book£5.25 (d) / Aud Cass(2)£7 (d)
ESPANA VIVA	Disc£19 (d) / Audio Cass(2)£8 (d) / Book£6.95 (d) / (2) £7.50 (a)
DEUTSCH DIREKT	Disc/aud/EC£16 (c) / Book£5.95 (d)
BLACK QUEEN A long awaited bridge game. (1770DFS)	£13(d)
BISMARCK History of the famous battleship. (1770DFS)	£13(d)

All software in this advertisement has been tested to work with appropriate Acorn Disc Filing Systems only and we are unable to comment on compatibility with any other filing system. It will be the buyers responsibility to verify such compatibility.

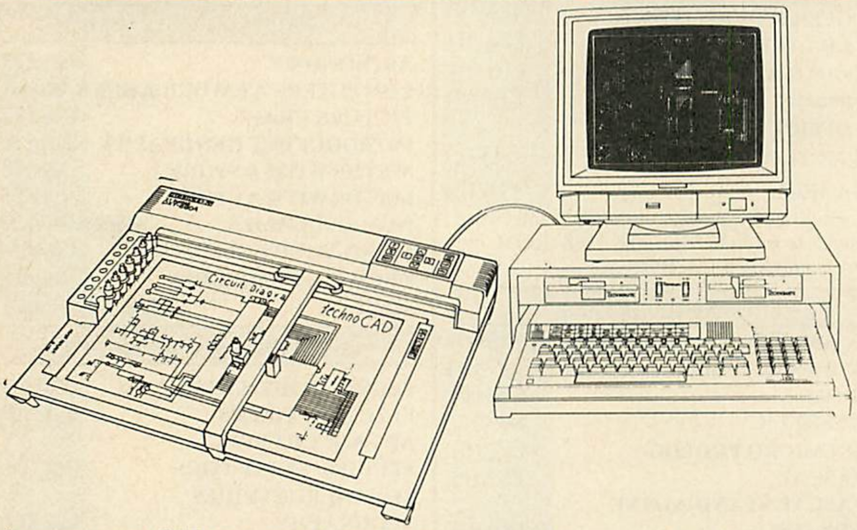
All prices ex VAT and subject to change without notice. See page 5 for Carriage Charges.

TECHNOMATIC

305 Edgware Road, London W2 Tel: 01-723 0233

technoCAD

COMPUTER AIDED DRAUGHTING FOR THE BBC MASTER



- ★ An easy to use CAD system with pop up menus providing a user friendly interface at all stages of operation.
- ★ Input can be configured for keyboard, mouse or tracker ball. Only three keys to input all commands if input from keyboard.
- ★ Virtually no limit to the size or complexity of the drawing that can be created. Powerful zoom facility allows a A0 size drawing to be viewed from single screen or a single screen can be enlarged to AD size. Continuous planning across a drawing by specifying co-ordinates.
- ★ Lines, arcs and circles can be drawn with ease and in user defined colour and thickness. These can be modified at any stage of drawing.
- ★ User definable grid and scale, together with on screen display of dimensions, and co-ordinates enable easy and accurate drawings.
- ★ Multi layering capability with 8 levels allows superimposition of drawings.
- ★ Powerful icon utility allows any shape or drawing to be saved to a library as an icon. Icons can be recalled from the library and palced anywhere on the screen drawing at required scale and orientation.
- ★ Toolkit program allows customisation of files, utilities and peripherals.
- ★ Drawings can be scaled on screen to suit the plotter or printer in use. A maximum resolution of 0.01mm is available. Pre-configured drivers for many popular plotters and a driver generator for any BBC compatible plotter is included. Printer drivers for Epson 9 pin and 24 pin printers are included as standard as is the facility for installing drivers for other printers.

FREE EVALUATION DISC AVAILABLE
Phone for your copy
£99(c)

BOOKS

No VAT Carriage Code (c)

LANGUAGES
- 6502 Assy Lang Prog ... £19.95
- 6502 Programming ... £13.95
- 8086 Book ... £23.95
- Acorn BCPI User Guide ... £15.00
- Acorn FORTH ... £7.50
- Acorn LISP ... £7.50
- Acorn ISO Pascal Ref Manual ... £10.00
- Intro to COMAL ... £10.00
- Intro to LOGO ... £7.50
- Micro Prolog Ref Manual ... £10.00
- Introduction to Turbo Pascal ... £14.95
- Prog the Micro with Pascal ... £8.50
- The Supervisor's BBC Micro ... £10.95

BBC MICRO GUIDE BOOKS
- Inside Information ... £8.95
- Maths Prog in BBC Basic ... £7.95
- The Friendly Computer Book ... £4.50
- Toolbox 2 ... £10.95

ARCHIMEDES
- Archimedes Reference Manual ... £29.95(b)
- ARM Assembly Language Prog ... £12.95(b)
- Inside Autosketch ... £15(b)

PROGRAMMING/UTILITY
- Advanced Sideways Ram User Guide ... £9.95
- Advanced User Guide (BBC) ... £15.95
- Applied Assembly Language on the BBC ... £9.95
- BBC Micro Advance Programming ... £9.95
- BBC Micro Ref Guide (B Smith) ... £10.95
- BBC Micro Sideways ROM's RAM's ... £9.95
- Guide to the BBC Rom ... £9.95
- Beginners Guide to W.P. ... £7.95
- Mastering Assembly Code ... £8.95
- **Mastering Interpreters & Compilers ... £14.95**
- **Master Operating System ... £6.95**
- **Mastering View, Viewsheet & Viewstore ... £12.95**
- **View by B. Smith ... £12.95**
- View 3.0 User Guide ... £9.00
- Viewstore User Guide ... £9.00
- Viewsheet User Guide ... £9.00
- Wordwise Plus ... £9.95

SOUND & GRAPHICS
- Computer Graphics & CAD Fundementals ... £9.95
- Mastering Music ... £6.95

DISC DRIVE SYSTEMS
- Advanced Disc User Guide ... £16.95
- Disc Book ... £3.50
- Disc Programming Techniques ... £7.95
- Disc Systems ... £6.95
- File Handling on the BBC ... £6.95
- Discovering Disc Drives ... £POA
- Practical Disc File Techniques ... £5.95
- Mastering the Disc Drive ... £12.95
- Mastering DOS plus ... £12.95

APPLICATIONS
- Interfacing Proj for BBC ... £6.95
- BBC and Small Business ... £5.75
- The Software Business ... £5.50

Mastering Operating System (David Atherton) ... £6.95

PRINTER ACCESSORIES

EPSON ACCESSORIES:
- **8143** RS232 ... £32 (d)
- **8148** + RS232 + 8k ... £79 (d)
- **IEEE 488** ... £40 (d)
- **Apple II** ... £40 (d)
- Colour option of EX800/1000 ... £55 (d)

TRACTOR FEEDERS
- **LQ800** ... £44 (b)
- **LQ1000** ... £55 (b)
- **LQ850** ... £70 (b)
- **LQ1050** ... £85 (b)
- **LQ2500+** ... £90 (b)
- **EX800** ... £85 (b)
- **EX1000** ... £90(b)

SHEET FEEDERS:
- **LQ800/850** ... £159 (b)
- **LQ1000/1050** ... £189 (b)
- **EX800/FX800** ... £159 (b)
- **EX1000/LQ2500+** ... £225 (b)
- **FX1000** ... £189 (b)

Ribbons:
- FX/FX100/100 +, FX105 ... £7 (d)
- RX/FX80, FX85/800 ... £4 (d)
- LX80/LX800 ... £4.50 (d)
- LQ800/850 ... £6 (d)
- LQ1000/1050 ... £7.75 (d)
- EX800/1000 Black ... £7.50 (d)
- EX800/1000 Colour ... £16.80 (d)
- H180 Pen Set (Aqueous/Ball point) ... £8.25 (d)

HITACHI 672 Plotter
- Aqueous Pen Set six pens ... £18.50 (d)
- Oil Based Pen Set six pens ... £25.00 (d)

TAXAN CANON Accessories:
- Ribbon, KP810/815/910/915 ... £6 (d)

Star Printer
- NL10/LC10 Sheet Feeder ... £55 (b)
- NL10/LC10 Ribbon ... £4.50 (b)

National Panasonic KX P1080/81
- Spare Ribbon ... £4.50 (d)
- KXP3131 Tractor ... £90 (a)
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- KXP3131 Ribbon ... £4.50(d)

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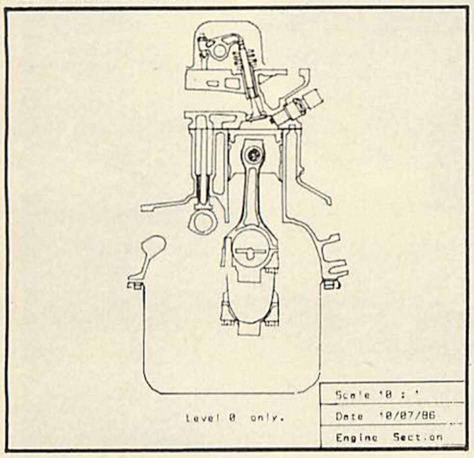
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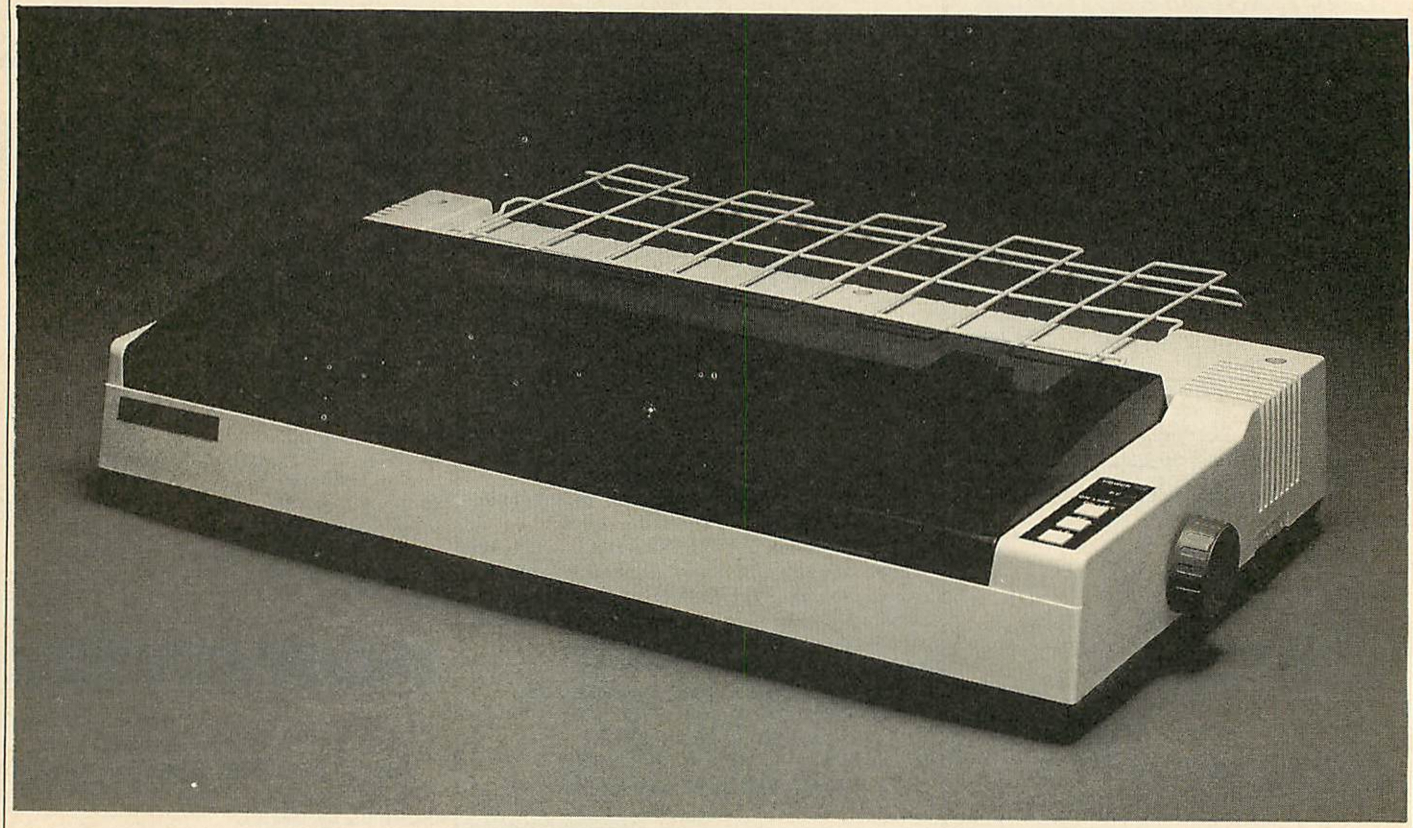
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HINTS & TIPS

SPEED AND SAFETY

Focusing on the Electron, with advice on how to save files, speed up printer output, plus a one-line label search program, and more

David Atherton

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ELECTRON FAST PRINTING

Brian Ross of Glasgow has sent in a couple of tips for Electron owners, showing that there are still many undiscovered points about the machine. The first item is on speeding up printer output, particularly graphics.

Interfacing a printer to an Electron is done almost exclusively using the Plus 1 interface. This works well for text printing, but the print speed is very slow for screen dumps when compared to a BBC micro using the same printer. I first thought that this was due to the slow speed of the Electron, but adding a Master RAM board did little to increase the speed of printing. Perhaps the interface was at fault.

The explanation is that the Plus 1 uses ROM polling to determine if the printer is ready to receive another character, as opposed to the BBC micro's method of using interrupts. Since ROM polling takes place only 100 times per second, this is the maximum output speed to the printer – 100 characters a second. The implication is that there is little point in connecting a printer which can print more than 100 cps since the interface will become a bottleneck.

Secondly, this explains the slow screen dumps – in double density graphics mode, 960 bytes are sent for each line. This will take nearly 10 seconds per line. Add to this the time taken to actually print the line, and there lies the explanation as to why screen dumps are so slow.

The answer to this problem is to ignore the Plus 1 printer software and access the interface hardware directly. The parallel port on the Plus 1 resides at location &FC71. The parallel interface busy flag is contained in bit 7 of location &FC72. Therefore the coding (in Basic equivalents) should be:



Speed increases for the Electron

```
DEF PROCprint (char)
REPEAT UNTIL(?&FC72 AN
D &80)=0
?&FC71=char
ENDPROC
```

However, after some experimentation, it became evident that some characters were being missed. This is because there is a very short delay between a character being sent and the busy flag going high. If the output routine is called during this period, then the printer will appear not to be busy even when it is; the character will be sent but not printed.

The solution is to employ a short delay at the beginning of the output routine. Translated to assembler this becomes the code in the box.

Thus instead of the code:

```
LDA #1
JSR oswrch
LDA char
JSR oswrch
```

you should use:

```
LDA char
JSR output
```

The speed increase is dramatic. I have adapted the standard mode 0 screen dump from Ian Birnbaum's Electron book *Assembly Language Programming.* The program as it stands takes three minutes 26 seconds to run (one minute 21 seconds for mode 4). My modified versions using only the technique described above take one minute 20 seconds and 54 seconds respectively, almost doubling the speed. The timings were taken using an Electron with Master RAM board and an Amstrad DMP2000 printer.

The vast majority of published screen dump programs have a separate subroutine for output, so that the VDU 1 can be dealt with separately. Often this will be entered with the character in the accumulator, which is then pushed onto the stack. The routine will typically read:

```
.output    STX temp
           STY temp+1
           PHA
.busyloop  LDX #2
.dloop1    LDY #0
.dloop2    INY
           BNE dloop2
           DEX
           BNE dloop1
           BIT &FC72
           BMI busyloop
           PLA
           STA &FC71
           LDX temp
           LDY temp+1
           RTS
.temp      EQUW 0
```

Code resulting from short delay

```
PHA
LDA #1
JSR oswrch
PLA
JMP oswrch
```

and this routine should simply be replaced with my copy above.

£5

SAFE FORMATTING

Another tip from Brian concerns the use of disc formatters and the fact that, if your controller is a 1770 chip, they destroy the data currently in memory.

This is because of the way the 1770 controller performs formatting, and applies to both BBC micros and Elks.

The only suitable facility available on the chip is 'write track', a command which writes a block of memory out to a whole track on the disc. Formatting programs build up an image of track data, including header marks, CRC bytes and so on in memory, and then in a single operation, write out the whole chunk of data to disc. The data occupies about three or four kilobytes, which is too much to put in a reserved area, so all 1770 formatting programs put the data in main RAM.

It is particularly frustrating when you have a full disc and no formatted discs to hand – you can't save your current file, and formatting destroys the program in memory. The ADFS 'COMPACT' utility allows the memory used to be specified, so if you know what you are doing, you can steer it clear of your data in memory. But "FORMAT" doesn't allow you to do this. Virtually all 1770 formatters use memory from OSHWM upwards, so if you could raise OSHWM above the top of your program or other data you could often preserve it and still format a disc.

Brian points out that you can indeed do this. There is a command, *FX180, which will alter OSHWM. If the data in question is a Basic program, type:

```
PRINT(TOP DIV &100)+1
```

which reports (in decimal) the first clear page of memory in the machine. Provided this is lower than about 119, there will still be sufficient space for the format map. Type *FX180, followed by the page number returned by the Basic command above, and run the formatter. Select mode 6 (or mode 7 on BBC micro) before doing any of this.

If you are using an Electron, you mustn't be in modes 0 or 3, or the disc system will be unreliable. And you must turn off the cursor (with VDU 23,1,0;0;0;0;), in case some screen RAM is used, because the Electron's software cursor slightly alters screen memory.

After formatting the disc, save your data immediately, and then press Break to reset the value of OSHWM. Alternatively, if you know what the normal value is (type PRINT PAGE DIV &100 when you switch on your machine), you can just reset it, by using *FX180 again.

It is feasible to use this method with the *View* family and other programs, but you will have to work out the top of the text by using the 'Bytes Free' count on the command.

£10
WORDWISE FILE SAFETY

```
 Words-127   Characters free-25540 I


REM Grandfather-Father-Son
REM by Julia M.E.Gwyther
REM for B/B+/M/C with Wordwise Plus
REM (c) Acorn User Jan 89
CLS
PRINT "     Save latest text as SON"
PRINT "     -----------------------"
PRINT
PRINT "Drive 0  Directory R will be
used"
PRINT
PRINT "Do you want to proceed?"
PRINT "Type Y or N"
G$=GCK$
IF G$<>"Y" AND G$<>"y" THEN PROCnosave
REM rename and save
PRINT
PRINT "          Save routine"
PRINT "          ------------"
PRINT
PRINT "Deleting GRANDAD"
```

Program keeps three latest copies of a file

Julia Gwyther from Bristol uses *Wordwise*, and wanted to make sure that she never lost her files. However, ordinary regular saving of files has a problem, in that you might save a file and then decide to reinstate some text you deleted before saving. Julia has written a short but very effective *Wordwise Plus* segment program which overcomes this difficulty by using the Grandfather-Father-Son method of taking backups.

This is a method familiar to large computer system programmers, whereby when a backup is taken, the previous backup is not overwritten or destroyed, but saved, as are all the previous backups. So you can go back and refer to any earlier version of the file, within reason. Julia's program keeps three copies; the latest version, and the two before that.

To use Julia's program, load it into a segment, say segment zero, before you start work, achieving this by typing in and saving the program under the name GDS, and including the lines:

```
SELECT SEGMENT 0
LOAD TEXT "GDS"
...
SELECT TEXT
```

in a !BOOT file on your work disc. Also on the disc must be three files called R.Son, R.Dad. and R.Grandad. Their contents are irrelevant, and they can be empty files – you can create these by saving a *Wordwise* segment or the text area with nothing in it.

Soon after starting work, press Shift-f0 to make a security copy of your work – this will invoke Julia's program. Now the existing files move down the generations. The Grandad file, the oldest version, is deleted, the Dad file becomes Grandad, the Son file becomes Dad, and a new Son is created containing the text at that point. This is achieved by simple Delete and Rename commands, but because it is all in a segment, you avoid using those commands directly. It saves trouble and avoids the possibility of mistakes.

Also, because of working under a managed system, your discs are not filled up with lots of old copies of your text. Using this system removes the necessity to delete old versions of a file.

£10
FADE TO BLACK

On many other brands of computer, a popular routine is a 'fade to black', a routine which blanks the screen if there is no keyboard activity after a certain time. The program supplied in the yellow pages provides this facility for a BBC micro, Master 128 and Compact.

If you type in the listing, and set the value of the variable 'seconds' to the number of seconds of inactivity before the system fades (from 0.1 to 1300 seconds are acceptable), then the program will assemble a machine code routine called 'BLACK', installed by *BLACK.

Once active, carry on working as normal, but the screen will instantly vanish if you don't touch the keyboard for the required number of seconds. Pressing any key restores the display at once without ill-effect. If you have a reasonable setting, such as the default, 30 seconds, this will mean that while you are working, you will never notice the feature, but if you leave the keyboard, the screen will go blank.

There are two uses for such a program. The first is to prevent monitor 'burn-in', which is the effect which occurs when you leave a monitor displaying the same image for a long time. The image gets burnt as a permanent 'shadow' on the screen. Though I've no evidence for this, it seems to be worse on amber monitors than on green or colour, and it occurs faster if the brightness is too high. In practice, most monitors would need to display the same image for several days before burn-in occurred; but if you left

your machine on accidentally over the weekend, and had this utility permanently installed, you needn't have to think about it.

The more usual use is that of privacy. With the program installed, you can be sure that if you leave the keyboard for a few minutes, no-one passing will see what is on your screen. True, all they have to do is press a key, but in practice very few people will do this, if all they see is a blank screen.

A third use is to remind you when you're daydreaming, if you have a lot of work to get on with. If the screen vanishes, buckle down and carry on!

The program works by the use of events and vectors. When you run the machine code, it installs a routine using the tried and tested method of event number 4, the frame flyback timer which is called 50 times every second. Each time the routine is called, if the screen is normal, a counter is decremented. When the counter reaches zero, the screen is blanked. If the screen is already black, this event routine does nothing.

Keypresses are always routed through the keyboard control vector (KEYV) at &228 and &229. This vector is only called when a key is pressed, so it is intercepted, and the timer is reset to the desired number of fiftieths of a second. If the screen is black, it is turned on again. In normal constant keyboard use, the timer is being constantly reset, so it never reaches zero.

The method used to turn the screen on and off is to program register 8 of the CRTC chip in your BBC micro. There are many methods by which the screen can be made black, but this is certainly the neatest one which works in all screen modes (including mode 7) and also turns the hardware cursor off. Register 8 is a write-only register, so the values required to program it must be known.

Fortunately these are given for each mode in the 'Advanced User Guide'. The register contains information about the cursor and display, but has special 'disable' modes, which are used here. Unlike some methods of programming the CRTC, disabling using Register 8 allows you to maintain the frame synchronisation, so that when the picture is restored, it behaves just like a palette switch, and there is no 'frame roll'.

The values required are &01 (&93 for mode 7) for normal display, and the &F0 (&FF for mode 7) to disable display. Note that the values for interface mode given in the Advanced User Guide are correct (&03) in the CRTC chapter, but wrong (&01) in the mode 7 screen table.

There are some drawbacks to the program. Firstly it will not restore the screen if you press CTRL, Shift, CAPS LOCK and Shift LOCK alone, as these keypresses are not vectored. Secondly, although the program does not restore the screen when a character is output, it does so when the cursor is forced on to a new line, because when this happens, the operating system makes a test (vectored through KEYV) to see if CTRL and Shift are being held down, so that it can halt output if they are.

£5

ONE-LINE LABEL SEARCH

Inspired by the one-line function and procedure finder from Nicholas Sayers in November's Hints and Tips, Phil Bender from Sunderland offers a one-line program for finding assembler labels in a Basic source program. The program simply LISTs each line which starts with a label.

Phil's program will find labels at the beginning of a line, and print them out up to the end of the label, or the end of the line. It works by passing through each line, checking whether the first non-space character in the line is a full stop, and if not, using the line length bytes to jump to the next line. As a result the routine is fast, finding about 35 labels in 6.5k of source in about seven seconds.

Phil points out that the same technique can be applied to Nicholas's program, which should speed it up considerably. To do this, alter Nicholas's MID$ expression to:

```
M."FNPROC",1-2*(M?J=24
2),2-2*(M?J=242))
```

and use real variables throughout. A number of readers pointed out that Master and Compact owners have the LIST IFDEF routine built in, to find definitions quickly.

Phil also offers an improvement to Susan Stepney's 1-D Life in the same issue. There is no point in plotting a cell in colour 0, as it is already the background colour, and therefore if the following lines are changed:

```
480 C%=A%?I%
490 IF C% THEN GCOL 0,C%:P
LOT 69,X%,Y%
```

and similar changes are made to lines 330-360, the program will run faster.

£5

INTERWORD WORDWRAP CONTROL

James Hunt of Denmark Hill in London has been preparing text in *Interword* which includes embedded listings. He found that one problem of including listings in a wordprocessor is that wordwrap can make the listing look odd, as listings tend to have long runs of characters without spaces in the lines.

Interword looks back along the line for the last space character, which could be near the start of the line, or perhaps between the line number and first character. In this latter case, the net effect would be that *Interword* prints the line number on a line of its own, and starts the text of the Basic line on the next screen line below.

James decided to investigate. He discovered that wordwrap can be turned off by setting the least significant bit of byte &48 in the *Interword* file. He then discovered that *Interword* stores the page number of the start of its current file in location &29 in zero page. He wrote a couple of simple programs, WRAPON and WRAPOFF, which locate and alter this byte directly. The net effect is to turn on and off the wordwrap facility.

To use the program, assemble the listings in the yellow pages, and two machine code programs WRAPON and WRAPOFF will be produced. These reside in the relatively safe area of page &9. To prepare a file with wordwrap disabled, such as large tables of figures, make sure that file is loaded and issue the command *WRAPOFF from the front menu. If you change your mind, type *WRAPON. You should type *WRAPOFF again for each new file you create. The change is stored permanently in the file when you save it.

A slight snag is that the effect is global, so when you turn off the wordwrap, any normal text paragraphs will lose the wordwrap effect. To avoid this you can spool the rest of the text out to disc, and reload it into *Interword*. This places carriage returns at the end of each line, so wordwrap is irrelevant.

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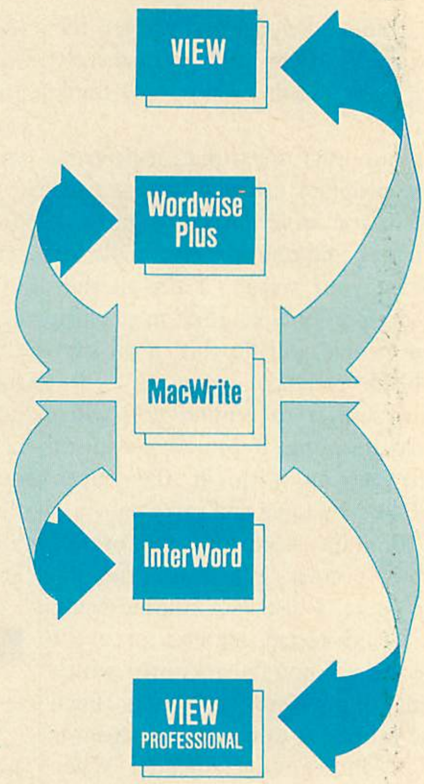
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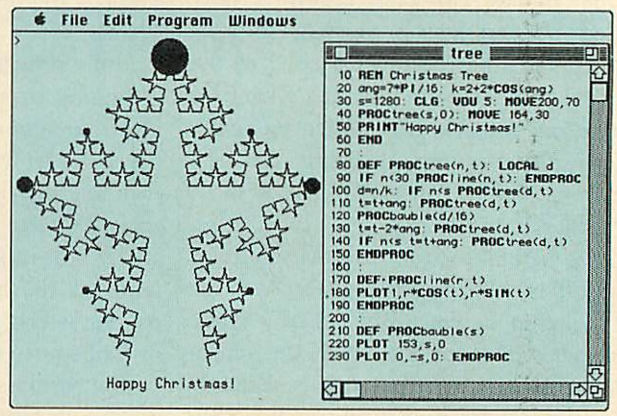
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ARC AGORA

SOUND BEGINNINGS

With a focus on music we look at sound generation, coping with disc faults and converting Master font files to the Archimedes

David Acton

I hope you'll forgive the near-domination of this month's Agora by the topic of sound, but I thought it was time this long-neglected subject had some decent coverage.

In fact, contrary to popular fiction, the way Arc sound works is very simple – there's no messing about with ENVELOPEs and the like. Sounds are only generated from digital data – rather like that on hi-fi compact discs, but of a lower quality. The peaks and troughs of the sound wave are represented as high and low numbers, and they are passed directly – in a stream – to the sound-generating hardware.

It is VIDC, the video chip, that actually plays back digitised sound. It does so by DMA or Direct Memory Access, in the same way as it sends a stream of video data to the monitor. You don't need to do anything once a sound is playing: your only job is to supply the next batch of sound data when asked by the Operating System.

In future columns, I hope to tackle the problem of sound scheduling and making music. But this month, I'm concentrating on sound generation and the building of a so-called 'level one handler'.

There are two ways of acquiring the data necessary to make a sound: you can digitise it using a sound sampler such as the A440 from Armadillo Systems or you can synthesise it using a little maths. There isn't the space to provide a proper digitised sound, so you must cheat and synthesise one. Listing 1 generates a sound datafile – called Raw – similar to one the A440 Sampler might produce. Make sure you have plenty of free disc space before you start – quite a few large files are going to be loaded and saved this month!

Those of you with A440 Samplers might like to *DUMP a saved sample



ILLUSTRATION BY RIAN HUGHES

file. You will see &18 bytes of information at the start and then the sound data itself. The 'zero' of the data is &80 and so if you record near silence, the values in your file will just hover around the &7F or &80 mark.

Remember that the numbers were not values of 'volume' but rather indications of where the loudspeaker should be at a given time – raw data in the rawest sense. The loudest noise would be one that switched from &00 to &FF, because that would mean the largest movements of the loudspeaker. Listing 1 produces a regular sound wave which steadily diminishes in amplitude. You might like to *DUMP the file Raw once it has been saved.

Such raw data cannot be fed directly to the loudspeaker. Firstly, the 'zero' point must be shifted down to (real) zero. Secondly, the Arc's loudspeaker expects sound data to be in a special logarithmic format. To make things more complicated, the sign-bit (determining whether the loudspeaker is in or out) must also be shifted: from bit 7 to bit 0. To simplify matters, a SWI call is provided to the conversions: "Sound_Soundlog" and listing 2 uses this SWI to convert raw files into a more usable format.

Run listing 2 and enter the Raw filename (or press Return for Raw). You will then be asked if you want to strip off the data at the start. When converting A440 files you should press Y; press N if converting your demonstration file, Raw, as this doesn't have the extra data put on by the Armadillo unit. Listing 2 then modifies the data, moving the zero down as it goes. Then enter the filename for the converted data (press Return to use a filename Demo).

Now you have suitable sound data; you just need a way of playing it back.

The basic procedure is to inform the OS that you have a new voice which may be used. Then you assign a particular channel to your new voice which you then use with SOUND.

To get the OS to recognise your voice you must attach it to a standard header, somewhat similar to a module header, which must be written according to some very strict rules. Once the header is complete, stick the sound data on the end and put the whole caboodle into a module. Listing 3 takes care of all this – make sure you have about 144k of spare RMA space configured before starting.

The actual sound header begins at .voicebase. First comes a series of branches, followed by an offset pointing to the voice name (this is the name shown by *VOICES). Four main routines are referred to in the branches: .instance, .gateon, .gateoff and .fill.

Having told the OS about your voice, should anyone use it to play a note these four routines will be called at various times. First, .instance is called. The function of this routine is to find the address of a logarithmic amplitude table. You'll use this later to scale your sounds according to the required volume.

Next, .gateon is called. This indicates that the time has come for the note to be played and the first lot of sound data must be passed on to VIDC. The .gateon routine points the register 'read' to the start of your sound data and then falls into .fill.

The routine .fill does the work of shuffling sound data, and is called whenever VIDC is ready for more. At the heart of .fill are five instructions – repeated four times to speed buffer-filling. The loop is unrolled so there are fewer branches to slow things down.

You have to make two adjustments to your data before playing it: it must be scaled (according to the volume parameter given in the Sound command that called it) and it must be played at the appropriate pitch. Different pitches are achieved by playing back sounds at different speeds: so-called 'false pitch'. This variation in speed is implemented using a cunning device called a phase accumulator (far too cunning for this column) and this is stored in the register called phaseacc.

Phaseacc is shuffled about and then used as an offset into your sound data. The volume adjustment is simpler than you might think: remember that your sound data is now logarithmic. The desired volume is supplied to .fill in R1, so you merely convert this to a logarithmic value and subtract it from each byte of sound data. Because it is a logarithm, this has the same effect as dividing down the volume.

Another instruction (MOVMI value, #0) is required to catch any negative amplitudes. The actual storing of the sound data in VIDC's buffer is done in steps according to the parameter dmastep. If only one voice is used, data is stored consecutively (so dmastep contains one); if two are used then the data for the voices are 'interleaved' (dmastep contains two), and so on up to a maximum of eight voices.

So, .fill shuffles bytes from your buffer to VIDC's four at a time until you've filled it up, after which you just need to decrement the centisecond time (the variable time) to see if your note's run its course. If so, .gateoff is called – the .gateoff routine is invoked whenever a note is to be terminated.

Run listing 3 and enter the name of a data file modified by listing 2; press Return for Demo. The sound module will be assembled, including your sound data, and saved as 'AU-' plus the first seven letters of the name of your voice; it could be called 'AU-Demo'. Now, you are ready to play.

Listing 4 searches through the current directory and lists all files beginning with AU-, noting all the sound modules. If there are none you will be told so; if there's just one it will be chosen automatically; if there are several you must enter the number of the one you want to use. Then, a brief but festive tune should be sounded in the voice of your choice. Your demonstration voice should appear as 'AU-Demo'. If you buy the monthly disc there will be a few extra voices to choose from.

This all might seem a lot of trouble to go to just to play a note. But do persevere – digitised or synthesised sound can enhance programs wonderfully if it's done with care.

£20

SLIPPED DISCS

Well, not so much slipped as corrupted. Whenever you encounter a disc fault it is always alarming. If you have two drives you can often rescue the uncorrupted files by *COPYing them from one to the other; if you have a single drive it can be a nightmare! A solution from Jason O' Broin wins him £20. (Listing 5 on the yellow pages.)

Jason's program copies discs sector-by-sector, using as much memory as possible (to reduce the number of disc-swaps needed). Simply format a blank disc to the same capacity as the corrupted one and Jason's program will copy across any sectors that have remained intact. Of course, some files may be corrupted – you'll have to test these out yourself – but the rest will be safe.

Run listing 5 and specify the size of disc to be copied by pressing 'L' (640k) or 'D' (800k). Press Return and then enter the source and destination drive numbers. Insert the appropriate disc when prompted and write protect the corrupted disc – you don't want any more accidents!

The copying process takes some time, so be patient. The program's progress is shown on the screen together with any disc-faults detected.

£10

BBC FONTS

£10 goes to Richard Averill for our last offering – listing 6 on the yellow pages. His program takes font files produced with Master utility "CharDes" and converts them for use on the Archimedes.

Run listing 6 and enter the name of the 'CharDes' font file. Then enter the name you want the Archimedes font file to be called. After a short while the Arc font will be ready. The file-type of the Arc font is set to &FF7 (or 'BBC Font') which means that you can simply *RUN the font to use it.

RISC OS

RISC OS upgrades for the Archimedes will be available from April 1989, and will cost £29 at first. Upgrading will definitely be worth it. The upgrade consists of four replacement ROMs, two application discs, a supplementary disc plus new manuals.

Send your programs, ideas, hints and tips to Arc Agora, BBC Acorn User, *Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ. The reward for items published is nationwide fame plus up to £20.*

Continued →

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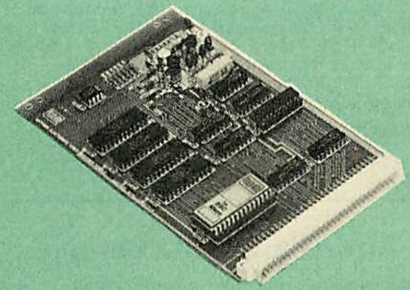
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Applications include desktop publishing, graphics, animation, image analysis and recognition, medical imaging, automatic inspection and measurement, databases, interactive video, remote transmission of pictures via a modem, movement detection ... or anything else you can think of!

SPECIFICATION

SOFTWARE

All the driver software for the digitiser is contained in a ROM on the podule. Facilities provided include:

- Grabbing of images to the screen or dumping to memory.
- Continuous grabbing and display for previewing or camera alignment.
- 'Hot key' grabbing – pressing a (configurable) key combination grabs and displays an image on the screen while another program (e.g. paint software such as Artisan) is running.
- Scaling (zoom/shrink) any section of an image to any size in X and Y directions, with optional X/Y flip, window clip and logical (AND/OR/XOR) plotting.
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- Very versatile matrix printer screendump facility for Epson FX, LQ and EX compatible printers – pictures can be printed to ANY size (including multiple sheets) at any orientation, using any available printer density and one of six internal sets of dot patterns, or with user definable patterns (pattern editor supplied). The screen-dump can also be used for general purpose graphics screen printing.
- Pixel value lookup tables: pixel values can be passed through a user defined lookup table to allow contrast enhancement, thresholding pseudo-colouring etc.
- Smoothing and noise spot removal to enhance image quality.
- Creation of sprites from all or part of a digitised image.
- Saving and loading of digitised images in compressed format.
- Combination of pictures by adding, avaraging, subtracting, multiplication etc.
- Much faster versions of the Arthur *ScreenLoad and *ScreenSave commands.

Software facilities are accessed via operating system star (*) commands and SWI calls. High resolution screen modes using MultiSync type monitors are supported.

UTILITY DISK

A disk is included, containing sample pictures, examples and utility programs including the following:

- Colour image grabbing using colour filters with monochrome or colour cameras, including colour balance adjustment and scaling facilities.
- Pattern editor for 2 colour display modes and printer screendumps.
- 512 line interlaced display for non MultiSync monitors.
- Thresholding to create two colour images.
- Capture and replay of animated sequences.
- Several example programs illustrating the use of digitiser software.

RESOLUTION

Images are digitised to 512 (h) x 256 (v) pixels, and then scaled to fit the Archimedes' screen. It is possible to digitise to 512 x 512 pixels if the picture is stationary for about 0.1 second. 512 x 512 images can either be displayed on a MultiSync monitor, or on a normal monitor using interlacing.

Pictures are digitised to 64 levels of grey (6 bits). Note, however, that it is only possible to display all 64 levels on a monochrome monitor, or a colour monitor which has a composite (CVBS) input. For this reason, the Philips CM8533 monitor is recommended instead of the standard Archimedes monitor. It is also possible to connect both a colour and a monochrome monitor at the same time.

Any 2,16 or 256 colour graphics mode can be used to display digitised pictures. In two colour modes, grey levels are represented using dot patterns, which may be redefined if required (a pattern editor is supplied). Cont.

SPEED

Video fields are captured in real time (1/50th sec.), and then transferred to Archimedes' memory or the screen. The grab/display rate is dependant on the screen mode and picture size, up to 25 fields per second for quarter screen images, or 12.5 per second for fullscreen (Mode 9).

HARDWARE

The digitiser is a single width podule, with a BNC socket on the rear panel for the video input, which may optionally be terminated via a link. There is 128K of on-board memory to store the digitised image, and a 32K ROM on the podule contains all the driver software.

Automatic video level control and black level clamping circuitry is used to ensure that the optimum contrast is obtained from a variety of video sources. A filter is included to avoid patterning effects when using colour sources.

Price £249

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*Velobyte, Scheaedyksadyk 5a-6a, 3011 EB Rotterdam, Holland, Tel: (010) 413 8197/414 5171.

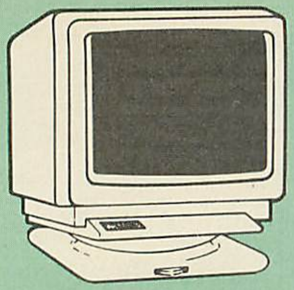
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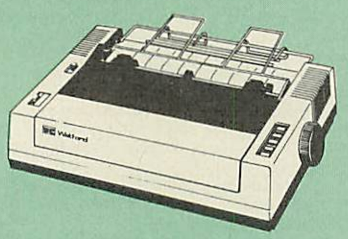
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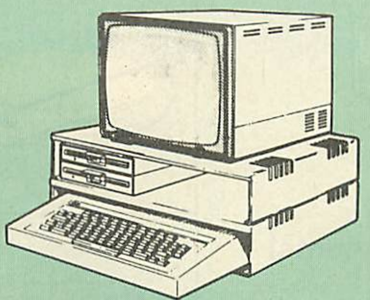
PRINTER LABELS

(On continuous fanfold backing sheet)

1,000 90 × 36mm (Single Row)	***£5.00***
1,000 90 × 36mm (Twin Row)	***£4.90***
1,000 90 × 49mm (Twin Row)	***£7.50***
1,000 102 × 36mm (Twin Row)	***£6.25***

Carriage on 1,000 Labels £1.00

PLINTHS FOR BBC MICRO, MASTER & PRINTERS

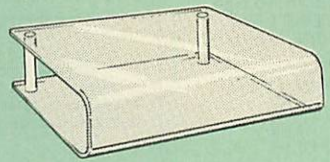


Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationary. The computer slides neatly in the lower section allowing easy access to remove the lid.

The single printer stand is equally sturdy but instead of cooling slots it has elegant cutouts on the sides. This allows easy access to paper from all sides. Colour: BBC Beige.

Single BBC Plinth	**£12** (carr. £2)
Double BBc Plinth	**£20** (carr. £3)
Printer Plinth	**£12** (carr. £2)
Single Master Plinth	**£13** (carr £2)
Double Master Plinth	**£24** (carr £3)

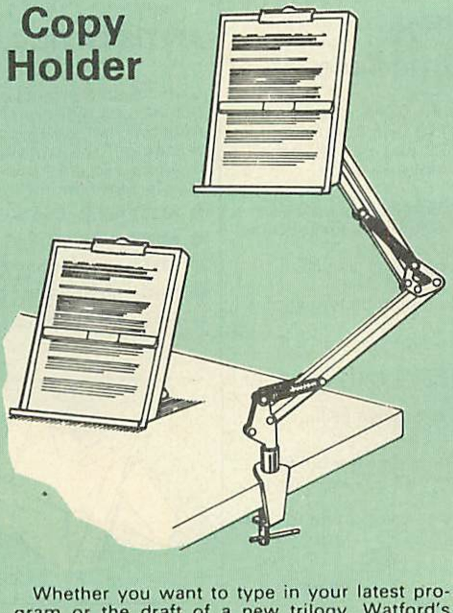
Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand. The printer sits on top and the fanfold paper rests neatly underneath, thus occupying the same space as the printer footprint.

Only: £16 (carr. £3)

Copy Holder



Whether you want to type in your latest program or the draft of a new trilogy, Watford's manuscript holders are superb for holding your paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip. (for resting books or magazines, the desk top version is recommended).

Desk Top **£10** (carr. £2)
Angle poise **£14** (carr. £3)

MEGABUFFER 256



The Smallest 256K Printer Buffer Unit in the world **38mm x 130mm x 134mm**.

This new Megabuffer 256 from Watford is a full featured 256K Printer Buffer. It allows the computer to print 256,000 character in a short time thus freeing the computer very quickly. In short it makes light work of printing large documents, screen dumps, etc. It is extremely simple to connect. The features are:

- Improves efficiency by making more efficient use of computer and printer.
- Compatible with any computer and printer that uses Centronics Parallel connections including all BBCs, IBM PCs, etc.
- Total compatibility with all software.
- Cheaper phone bills when using your Modems.
- Ideal for those doing large graphics screen dumps that are slow to print.
- Multi-Copy facility allows you to print several copies via Megabuffer without going through your computer.
- Data Dump facility is included.
- Built in test unit for both the buffer & your printer.

In conclusion it can safely be said that MEGABUFFER 256 is the ultimate printer Buffer for both the amateur and professional user.

Only £149 (carr £2)

OKIMATE COLOUR PRINTER

The first ribbon transfer printer in its price range which offers fully versatile colour or black printing. A 24 element print head produces more than 100 shades with exceptional clarity. Ideal for use with Quest Paint or AMX Super Art.

Only: **£119**

BBC Screen Dump	**£10**
Colour Ribbon	**£6**
Black Ribbon	**£6**

THE EPSON RX-FX-KAGA PRINTER COMMANDS REVEALED

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out. Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible Printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from BASIC and Wordwise.

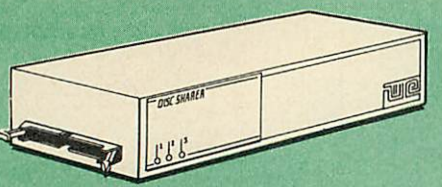
It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

Continued →

DISC DRIVE SHARER



(Ideal for educational establishments)

At last, a low cost alternative to the Econet system. Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Launch Price: **£65** Price includes 3 Cables

NOW WITH EXTRA FEATURES AT NO EXTRA COST – Watford's latest DFS 1.44

- Incorporates Acorn's Official Tube Host Code so that those with 2nd processors no longer need to waste a ROM socket on the DNFS.
- Option to DOUBLE the speed of BPUT and BGET.

WATFORD's & ACORN's SINGLE DENSITY DFS

Watford's popular and widely acclaimed DFS has now been available for six years and has gained a large following amongst serious and educational users of the BBC Micro. Owners of Acorn or any other standard DFS can upgrade to our "Ultimate" DFS merely by replacing their DFS ROM. See below for this upgrade. ***(P.S. Watford's highly sophisticated DFS is fully compatible with Acorn standard DFS). (while Acorn's 1770 DFS is fully compatible with Watford's Mk II DDFS)***

- *Complete Disc Interface Kit including DFS ROM and fitting instructions* **£48**
- *Acorn's 0.90 DFS Kit complete* **£49**
- *DFS Manual (Comprehensive)* *(no VAT)* **£6.95**

  (P.S. Our DFS manual is the only comprehensive Manual available for the BBC micro and covers both Acorn & Watford DFSs).
- *Watford's sophisticated DFS ROM only* **£16**
- *We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only* **£12**
- *DNFS ROM only* **£17** • *ADFS ROM only* **£25**

NEW

Watford's MkII 1770 Double Density DFS Interface

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features:

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£30.00.**

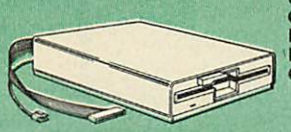
- Special introductory offer **£39.00**
- DDFS Manual (No VAT) **£6.95**
- We will exchange your existing DFS Kit for our sophisticated DDFS for only **£25.00**

Please note, as the MkII DDFS is a hardware and software upgrade, it is not possible for existing Watford DDFS users to simply exchange their ROM for the new version.

DUST COVERS (For our Disc Drives)

Single CLS (without PSU) **£3.20** Twin CLD (without PSU) **£3.85**
Single CS (with PSU) **£3.95** Twin CD (with PSU) **£3.90**

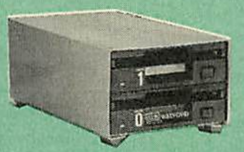
Special 40/80 Disc Drive/DDFS Mk II Offer



- The popular 40/80 track 400K single Disc Drive, Double Sided, cased with Cables. Plugs directly to your Micro.
- Watford's extremely popular DDFS Disc Interface (allows 720K storage). Will run in both, Single & Double Density modes.
- A comprehensive User Friendly Manual.

A Bargain at Only **£125** (£6 carr)
(Offer valid while stocks last)

3½" DISC DRIVE OFFER



These top quality 3½" Double sided, 80 track, 1 Megabyte (unformatted each Disc Drives), are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc. They run directly from the BBC B/Master's own PSU.

- **CLS35 400K Unit** **£69**
- **CLD35 800K Unit** **£126**

Mysteries of Disc Drives & DFS Revealed

Are you tired of faulty cassettes, and lengthy loading times? Do you want to upgrade your BBC micro to take discs but you get tied up in the plethora of jargon surrounding the choice and use of these systems.

Then The Mysteries of Disc Drives and DFS Revealed is the book for you. It explains in detail the different types of systems available, how they are installed and how to use them. Many examples are given including pre-written programs to call various functions of the DFS available only through Operating System calls. Different types of disc, 40/80 tracks etc. are all explained. This book is ideal for the beginner confused by the plethora of choice available in the marketplace.

£5.95 (Book No VAT)

DISC ALBUMS

Attractively finished in black leather look vinyl. Stores upto 20 Discs. Each disc can be seen through the clear view pocket.

£4

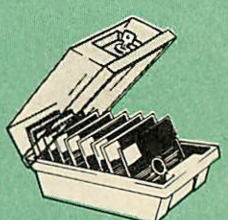
FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use. Available in 3½" & 5¼", please specify.

£4

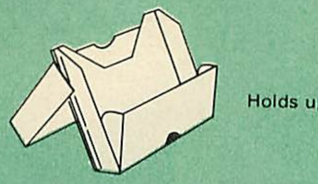
ANTISTATIC LOCKABLE DISC STORAGE UNITS

Gives double protection – Strong plastic case that affords real protection to your discs. Antistatic helps avoid data corruption whilst in storage. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.



- **M35** - holds upto 50 5¼" discs **£5.00**
- **M85** – holds upto 95 5¼" discs **£8.00**
- **M25*** – holds upto 25 3½" Discs **£5.50**
- **M50** – holds 50 3½" Discs **£7.50**
- **M10** – holds upto 10 Data Cartridges **£15**

* Not lockable



PLASTIC LIBRARY CASES

Holds up to 10 5¼" Discs. **Only £2.00**

DISC PLONKER RACK

When using ones micro, there is a tendancy to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk.

Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. It holds up to eight 5¼" Discs.



Protection at Only: **£2**

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

The first capacity given in the first column indicates capacity in single density mode. That within the brackets is the capacity in double density mode. All disc drive type numbers start with the prefix "C"

The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). All our 80 track drives are already fitted with a 40-80 select switch.

***All our Disc Drives are Double Sided and will operate in both Single and Double Density modes.** Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*

Various UK "manufacturers" of disc drives for the BBC micro (more accurately, "packagers" label other manufacturers drives with their own name). We buy the high quality NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

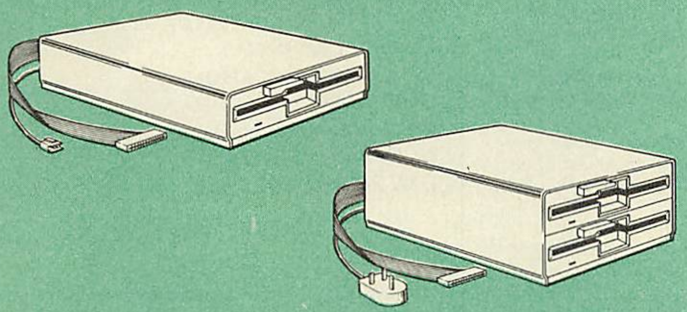
If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. Ideal for Schools & Colleges. We are now able to supply all single disc drives with Power Supply, in either single or dual case. (Dual case has a twin data cable and a power supply capable of driving two disc drives) allows easy expansion to a dual drive unit, at a later date. Prices stated in the pricing boxes below are for single drives in standard single cases. Single drives in a dual case cost an extra £5. (At Watford we anticipate your needs of tomorrow, not just today)!

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC, Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with Watford plinth. (Turn to the 5th page of our advert for the Plinths).

P.S. All our 5¼" Disc Drives with PSU are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.

Our Disc Drives conform to BS415



Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
200K (360K)	CLS 200 £89		CS 200 £98	
400K (720K)	CLS400S £82	CLD 400 £168	CS 400S £92	CD400 £188
800K (1.44M)		CLD 800S £162		CD 800S £182

● TWIN Disc Drive Case, complete with Power Supply & Cables **£43**
Securicor carriage on Disc Drives £5 to £6

*Prefix **C** = Cased Drive*
***L** = Less PSU*
***S** = Single*
***D** = Double*

*Suffix **S** = 40-80 Switchable*

e.g. CLS400S = Cased Disc Drive, Less power supply unit, single 5¼" 400K, (720K in double density); Double sided; 40/80 track switchable.

Cable to connect 5¼" Disc Drives to BBC Compact
Single £9 Twin £12
Special Cable to connect both 3½" and 5¼" Disc Drives simultaneously to the BBC Compact £13

3M – DISKETTES

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electronics your 3M Appointed Distributor.

- *10 × 5¼" S/S D/D 40 Track Diskettes (744)* ***£6.00***
- *10 × 5¼" D/S D/D 40 Track Diskettes (745)* ***£7.50***
- *10 × 5¼" S/S D/D 80 Track Diskettes (746)* ***£11.50***
- *10 × 5¼" D/S D/D 80 Track Diskettes (747)* ***£11.00***
- *10 × 5¼" 1.6M D/S D/D High Density Discs for IBM XT and AT* ***£19***
- *10 × 3½" S/S D/D 40/80 track Discs* ***£10.00***
- *10 × 3½" D/S D/D 40/80 track Discs* ***£11.75***
- *10 × 3½" High Density Diskettes* ***£35***

TOP QUALITY 3½" & 5¼" DISKETTES

To complement our range of Quality Discs and Disc Drives, WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

- *10 × **M3** 3½" D/S D/D 80 Track Discs* ***£11***
- *10 × **M9** 3½" Double Side High Density* ***£34***
- *10 × **M4** 5¼" S/S D/D 40 Track Discs* ***£5***
- *10 × **M5** 5¼" D/S D/D 40 Track Discs* ***£7***
- *10 × **M7** 5¼" D/S D/D 80 Track Discs* ***£9***
- **10 × M8 5¼" D/S H/D Hi-Density Discs** ***£14***
- *3" Double Sided Discs* ***£2.50** each*

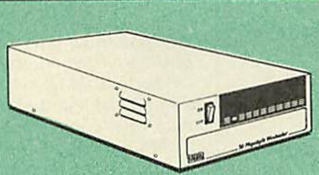
PRICES SLASHED

Special BULK OFFER on 5¼" DISCS

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

BULK PACK DISCS in lots of 100

Type	S-S 40T	D-S 40T	D-S 80T
● Without Sleeves	£35	£39	£45
● With Sleeves	£38	£42	£48



WATFORD's WINCHESTER DRIVES

Undoubtedly the best value for money Winchester Hard disc available anywhere for the BBC Micro.

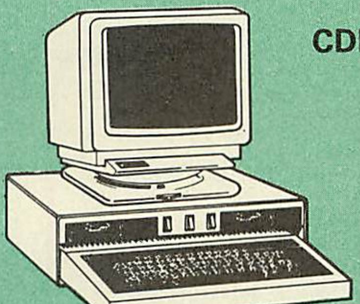
This 30 Megabyte hard disc is completely compatible with the Acorn ADFS – that's why we have bundled it with each Winchester drive, along with a Utilities Disc.

Finished in rugged metal and fetching BBC beige, the Winchester has an internal fan, so quiet you won't even hear it! A switched mode power supply and a neon-lit on/off switch are there along with a light on the hard disc to tell you when it is working – just compare the price with our competitors' 20 or 28 Mbyte discs!

Compatible with the Master, and the BBc B (with 17 X disc interface).

● 10 Megabyte **£350**; ● 30 Megabyte **£420**

CDP800S CDPM800S



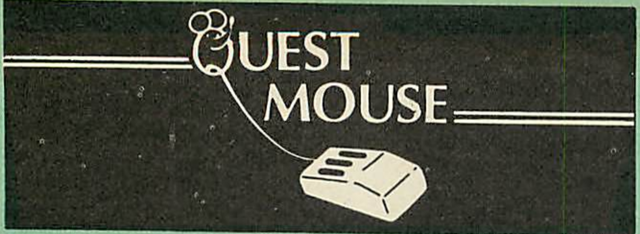
Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

CDP 800S for BBC Micro £192
CDPM 800S for Master £196
DP35-800 for BBC/Master £165
(For DP35-800S spec. see Page 9 of our advert)
(Securicor Carr. £7)
(The above drive units are 2 Megabytes unformatted)

Continued →

NOMINATED FOR

BRITISH MICRO COMPUTING AWARDS 1987



QUEST MOUSE

The ultimate in Mouse technology, the Watford Electronics Quest Mouse must be the most powerful Mouse package yet produced for the BBC Micro. Featuring state of the art 32K ROM software the Quest Mouse package is filled with features essential to the budding artist. The Quest Mouse is a high precision, low profile and large footprint mouse. It has three large comfortable buttons and its RUBBER COATED STEEL BALL is smooth and easy to use on virtually any work surface. This also eliminates any directional bias that one encounters on the most well-known mouse for the BBC. The Quest Mouse is FULLY HARDWARE COMPATIBLE with the AMX MOUSE so that it will work with any of the AMX range of software.

The two parts of the Quest package are available separately so that existing Mouse owners can upgrade to the Watford's sophisticated Quest Paint software or replace their existing worn out mice for a minimum cost.

QUEST PAINT

The Quest Mouse software is supplied on a PALPROM unit to allow the sophisticated 32K program to be used from a single ROM socket. It is compatible with the BBC B, BBC B Plus and BBC Master Series machines.

The software is used to draw high resolution Mode 1 pictures in full colour. All menu selection and control of the drawing process is performed with the mouse so that you will hardly ever touch the keyboard.

SOFTWARE FEATURES

The software is far too powerful for us to describe it fully in such a small space. Below is a list of the various features. Please write to us for a fully descriptive leaflet.

Disk interface not required. Utilities disk has facility to create and print big screens. Colours applied can be solid, either pattern of user defined pattern. Drawing can use brush or airbrush. Brush shapes can be defined and stored. Airbrush sprays colour/pattern randomly with four jet sizes and even or center spread. Colour cycles. Colour protection to stop particular colours from being overwritten by selected drawing actions. All standard drawing facilities like: rubber, straight pencil lines, triangles, circles, ellipses, rectangles, parallelograms, polygons, etc are provided. All shapes can be solid or just a boundary line. Once a shape has been set up it can be repeated anywhere on the screen. Global colour replace in a rectangle. Powerful fill facility for areas and vertical/horizontal lines. Full cut and paste of rectangular areas with rotation and size with screens from Watford Beeb Video digitiser. Load and Save screens with colour pallet information, save brush and pattern definitions etc.

Take The Guesswork Out of Selecting a Mouse Package

With reviews like this how can you go wrong.

Popular Computing Weekly, 9-11 June '87

"What you actually get for your money is a well built, three button mouse (far superior to the AMX mouse)."

"Overall the combination of a quality mouse and decent art package gives Watford Electronics a real chance of supplanting AMX as mouse supremos."

Micro User June '87

"Quest Mouse and Quest Paint can hold their heads high in the market. . ."

A&B Computing June '87

". . . Watford Electronics, a company famed for excellent hardware add ons and versatile software packages. Called Quest mouse, "this is a very special mouse driven drawing package..." ". . . you will have one of the most comfortable and professionally built mice I have used in a long time. The buttons are responsive, the mouse movement is smooth and without directional bias – a pleasure to use."

"What we have here is probably the best art package there is for the BBC Micro . . ."

"Quest Paint is a major leap forward in BBC programming. . ."

"Quest Paint is an original piece of programming, it is friendly and well endowed with many useful facilities. I would comfortably say it is easier to draw good pictures with Quest Paint than it is with more expensive 'Professional' art packages for the Atari ST and the Commodore Amiga. A recommended buy if you are looking for the best in BBC micro based art packages".

Acorn User, September '87

"The mouse (Quest) performs well in the face of competition from AMX, Wigmore and the rest . . ."

". . . this package represents excellent value for money. If you are interested in art then this program is for you to buy".

"Given time, I can see no reason why Quest Paint shouldn't take on the title of the definitive art package available for the BBC Micro to date".

"All in all, Quest Paint is a very professional package. It contains virtually every feature the budding artist could require".

"What makes Quest Paint so versatile is the addition of a sub-menu which allows you extensive control over each function".

"Until recently, Superart from AMS had been judged as the definitive mode 1 graphics package for the BBC micro. But now it has a serious rival in the form of Quest Paint, from Watford".

"As a measure of what is contained within Quest Paint, I would say it had all the features of Superart plus . . ."

"In most art packages, provision is given for drawing triangles and rectangles. Quest Mouse goes 14 better, allowing any regular polygon of upto 16 sides".

"One facility, not found on any other Art package to my knowledge, is the ability to access a digitiser from within the program". The reviewer concludes by saying, "The result is an extremely comprehensive and professional art package".

John Kilby, Head of Computer Science, Bishop Wulstan High School, Rugby, writes:

"Quest has been an excellent piece of equipment. The problem that seems to occur everyday is that at lunchtime the pupils rush to the computer room to make sure that they are first in the queue for the 'Quest' mouse".

Lt. Col. C.G. Holton, HQ 1 (BR) Corps, BFPO 39, writes:

"As ever your service is superb and the Quest Mouse proves every bit as good as the adverts claim".

Beeblet User Group, New Zealand Oct '87:

"One of its nicer features is that the top menu is done in Mode 0, the drawing itself is in Mode 1. Thus on screen together are two different Modes. A neat way around an old problem".

"PAN is used when a larger than one screen size image is required. The mind boggles at an A3 size drawing".

"I like it partly because of the mouse itself which is smooth and easy to handle but mainly I suppose because of the features I longed for and previously never got. Its easy to use with almost everything at your fingertips from the mouse. The software is simple where needed and complex where complexity is required".

ConQuest

Watford's Quest package is an extremely powerful and flexible drawing package, with very wide and unusual features. However, since its launch various suggestions for even more advanced & powerful facilities were received from the Quest users. ConQuest allows you these more advanced facilities, like, distortion of a cutout to any shape and a full font designer. If you also have a GXR ROM in your machine or you are using a BBC Master then · ConQuest will take advantage of this to give ellipses at any angle, sectors and arcs, etc. Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

Some of the features are:

- *Pick filenames off the screen for loading and saving.*
- *Rotate a cutout to any angle and Distort it to any four sided shape.*
- *Has Built in Font editor.*
- *Default brushes and patterns on startup.*
- *16 x 16 font available on start up.*
- *Ability to reset patterns, fonts and brushes to default at any time.*
- *ROM based enhanced Epson and compatible printer dump.*
- *ROM based enhanced extended picture routine.*
- *Ability to create and abort extended pictures.*
- *Improved disk access speed for extended pictures.*
- *User definable sideways RAM driver for incompatible sideways RAM systems.*
- *Ellipses at any angle on Master 128 (or B with GXR ROM).*

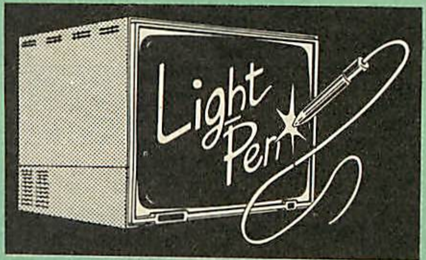
QUEST MOUSE & QUEST PAINT	**£49**
QUEST MOUSE, QUEST PAINT, AMX PAGEMAKER & PAGEFONT	**£82**
QUEST MOUSE ONLY	**£25**
QUEST PAINT SOFTWARE	**£32**
QUEST FONT DISC	**£12**
ConQuest 32K ROM Package	**£29**
QUEST MAT	**£3**
Part-exchange your old Mouse for a New QUEST MOUSE for only	**£23**
GXR ROM for BBC Micro	**£22**

N.B.

1. Quest Paint supplied complete with Software in a 32K ROM, Comprehensive User Guide and a Utility Disc.

2. Quest Font Disc has 22 text FONTS for use within Quest Mouse.

MARK II LIGHT PEN



Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted.

Price Only £21

(Price includes FREE software Disc and Operating Manual)

RB2 Marconi Tracker Ball

RB2 (AMX/Quest compatible)	£49
RB2 including Quest Paint	£78

FLEET STREET EDITOR

Software pack for BBC Micro	£33
Software pack for the Master	£39
Software Pack for Compact	£40
Admin Xtra Disc Utility	£13
Walt Disney Disc Utility	£13
Fonts N Graphics Disc Utility	£13

THE NEW Mk III AMX MOUSE

ONLY: £59 **Inc. Super Art package**
(carr £1.50)
(Please specify for BBC, Master or Compact)

FREE our popular Colour Art software pack worth £15 with every AMX Mouse package purchased from us.

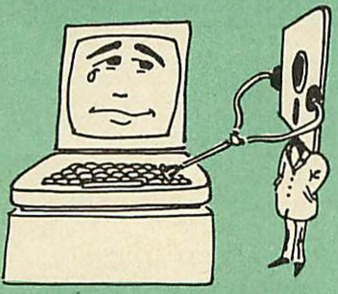
MOUSE MAT	£3
AMX MOUSE ONLY	£29
AMX UTILITY Package	£11
AMX SUPERART Package	£34
AMX STOP PRESS – A Desktop publising software. Works with Keyboard, Joystick or a mouse	£32

We are giving away absolutely FREE, our PAGE-FONT disc with every purchase of STOP PRESS from us.

PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	£12

AMX DESIGN (ROM)	£55
AMX XAM Educational	£15
AMX EXTRA EXTRA	£16
AMX MAX A gem of desktop (ROM)	£15

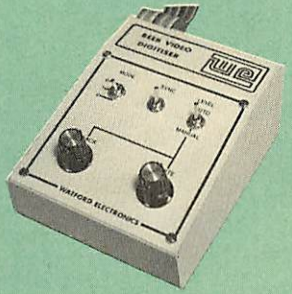
DIAGNOSTICS DISC



The BBC Micro is a very complex machine and thus diagnosing a fault can be very difficult. At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.
The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb:
RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS423, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.
This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

Only £20.00

BEEB VIDEO DIGITISER



Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.

This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem.

The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.

Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional * commands. The package i designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROMs to work on it.

A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image.

Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

£109 (Carr. £3)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)
(BBC B+ and Master compatible, except Master with Econet)

Magazine Maker

(As seen on TV)
A combination of the Pagemaker and Watford's Beeb Video Digitiser.

Using any video that provides a composite signal and the digitiser, images from a camera or TV can be converted into a graphics screen on the BBC Micro.

They can then be used within Pagemaker to illustrate magazines or newsletters – in fact anything that needs to be created on A4 size paper.

With Pagemaker's many features, a variety of pictures can be composed – the only limit being the imagination.

Pictures can be doctored using Pagemaker's graphics option to produce any number of effects.

Text can be formatted around the digitised photo on screen using the facilities available, which include 16 typefaces, character and pattern definer, text formatting and the ability to load in wordwise and viewfiles plus much more.

Once created the picture can be printed out.

The Magazine Maker is suitable for any use that requires illustrated documents.

Complete Package **£135.00** (carr. £3)

OFFICE MASTER



CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trail balance.

FINAL ACCOUNTS – Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

MAILIST – A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques.

EASILEDGER – A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.

INVOICES & STATEMENTS – Greatly reduces the time and cost of preparing Invoices and Statements by storing essential information like customer names, addresses and account numbers. Has VAT routines and footer messages facility.

STOCK CONTROL – Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only **£21** (Disc)

OFFICE MATE



- DATABASE
- BEEBCALC SPREADSHEET
- BEEBPLOT GRAPHICS

DATABASE – Set up a computerised card index system with powerful search facilities.

SPREADSHEET – Offers many calculation and editing features.

BEEBPLOT – Provides visual representation from Spreadsheet data.

OFFICE MATE Only £10 (Disc)

Disc Drives DP35-800S



A Double disc drive – with a difference! Times are changing fast for the floppy disk, and whilst the current standard for the BBC B and Master Series is the 5.25 inch disk, the standard for the future will most certainly be the smaller; faster and more reliable 3.5 inch disks – now a standard feature of both the Master Compact and the Archimedes Series.

To support the present disc drive users, and cope with the future, we have designed our own plinth-mounted disk system – called the DP35 800S, it contains both the 5.25 inch and the 3.5 inch drive formats as well as offer a firm and rigid support for a monitor on top. With the BBC Micro underneath, the plinth makes a surprisingly small footprint on the desk – leaving you more space to work with.

The 5.25" disc drive is 40/80 track switchable. For ease of access, the switches are front mounted. DP35-800S has its own power supply, independent of the BBC Micro.

Watford's new plinth enables users to read, write and format disks both in DFS and ADFS format – currently the accepted standard for the Master Compact and the Archimedes, it also enables the user to read disks written for the Archimedes. Ideal for both BBC & Master.

Launch Offer: **£165** (carr. £7)

Continued →



ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Comal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on your BBC micro – no flying leads to connect and no soldering. Provision of the on-board ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£80** (carr. £2)

Aries B-12 Sideways ROM Board

This board is extremely well made, simple to install, reliable when fully loaded and compatible with the Aries-B20 and the Aries-B32

The B12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

The B12 system consists of two parts: a large detachable "mother board" which carries the extension ROM sockets and a small "base board" on a short ribbon cable, which plugs into the existing sideways ROM sockets. This two-board design eliminates the reliability problems previously associated with some other ribbon-cable based systems.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost.

Price:	Aries B-12	**£40**
	Aries B-12C	**£5**

ARIES B-488 IEEE-488 INTERFACE UNIT

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP-IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

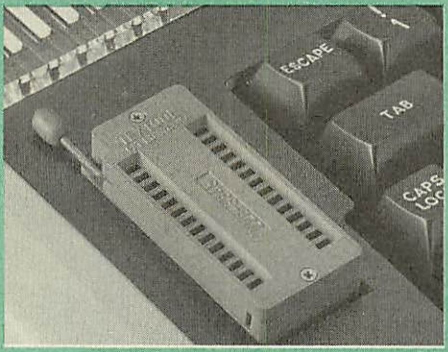
£238 (Carr £3)

EXTERNAL ROM BOARD for BBC MASTER

This external Beige finished, free standing cased unit with its own Power Supply allows you to plug-in upto 12 ROMs and 16K Sideways RAM.

Only £78

SIDEWAYS ZIF SOCKET



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for all professionals and Hobbyists alike.)
- BBC, B+ and Master compatible.

ONLY **£16** (carr £2)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

Complete System	**£11**
Spare Cartridges	**£2.50**
Spare Rack	**£1.50**

ROM Cartridges for the BBC Master
Twin **£8**; Quad **£12**

16K DISC RAM

Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.

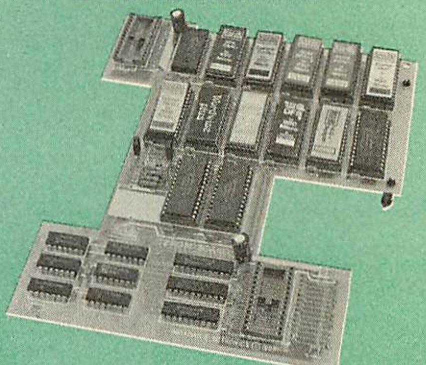
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances).
- Read protection (allows recovery from ROM crashes).
- Compact construction.
- Supplied complete with Battery Backup.
- Multiple units may be fitted, even with a ROM board.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£35** (carr £2)

P.S. 16K Disc Ram Board is not designed to work in conjunction with a Sideways ROM Board.

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



In the May 1986 Micro User's independent review, the writer concludes, "The board has been well laid out. Its position is much better than others – not over the HOT RAM chips and further away from the disc controller area". "I give the solderless ROM board the thumbs up and wish it success".

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16.

Unlike our competitors inferior boards, the ONLY upgrade required for fitting battery backup to the Watford Solderless ROM board (all Watford ROM boards, actually) is the fitting of the battery itself. (No other expensive components are required.)

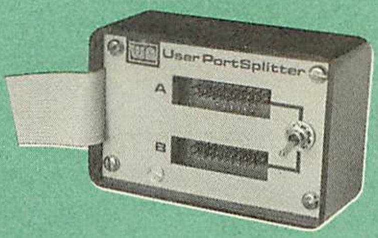
- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £32
Battery backup fitted **£36**
Battery Backup only **£3**
(carriage £2)

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

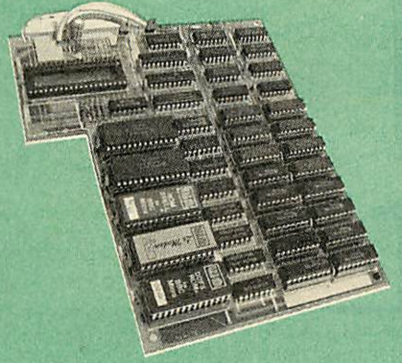
USER PORT SPLITTER UNIT



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaniously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination.

Excellent Value at **£22** (carr £2)

ROM/RAM CARD



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 3 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- No User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with all BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of Battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Accepts any ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE Fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROM-SPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later:

Please write in for further details.

INTRODUCTORY PRICES:

- ROM/RAM card with 32k dynamic RAM **£48**
- ROM/RAM card with 64k dynamic RAM **£65**
- ROM/RAM card with a massive 128k dynamic RAM **£109**

(carriage on ROM-RAM Card £3)

OPTIONAL EXTRAS:

- 16k plug-in Static RAM kit **£17**
- 16k Dynamic RAM for Upgrade **£17.50**
- Battery backup **£3**
- Read and Write protect switches .... **£2 each**

Complete ROM-RAM board
All options installed **£115**

P.S.
Is your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford ROM/RAM Board and pay £5 less

Le Modem



The MODEM from Watford

At last a professional MODEM for the BBC Micro. Unlike other 'Modem packages' this is a complete package there are no extra software costs to get 'up and running'. Of course Le MODEM is multi-standard, i.e. 300/300, 1200/75 & 75/1200 UK and BELL (USA) are all supported.

The features that make Le MODEM such good value are:

- *A complete communications terminal that transforms your BBC Micro into a very powerful World-wide data transfer system.*
- *Auto Dials, Auto answers, and is completely controlled by your micro. There are no external controls!*
- *Allows you to access PRESTEL, B.T. GOLD, THE SOURCE, MICROLINK, MICRONET, MICROWEB, THE TIMES NETWORK, MICRO LIVE (BBC TV database), CITY BB and more.*
- *Designed to be SIMPLE but SOPHISTICATED. To LOGON to a data base all you have to know is its TELEPHONE NUMBER, Le MODEM does the rest.*
- *Supplied with a comprehensive telecomms package in a 16K sideways ROM which includes a FULL PRESTEL terminal allowing TELE-SOFTWARE to be downloaded.*
- *A comprehensive 80 column terminal. This includes XMODEM error checked transfer protocol, to allow error free data transfer anywhere in the world!*
- *FULLY controlled by simple '*COMMANDS allowing you to control it from your own BASIC programs. To get you started we supply a FREE disc of bundled software!*
- *Connects to the 1MHz bus. A *AUDIO ON-OFF command allows you to actually hear the telephone line through your BBC micro loudspeaker.*
- *Completely self contained with internal mains power supply. (Even a free mains plug is fitted!) A *TEST facility gives ON SCREEN indication that Le MODEM is working correctly.*
- *Packaged in such as way that you need nothing else except a BBC Micro to communicate with computers all over the world.*
- ***FREE Registration to MicroLink.***

SPECIAL OFFER

Price: ***£75***
(carr £3)

(Price includes, Le Modem, Software ROM, Cables & Comprehensive Manual)
(Write in for further details)

REPLICA 3

This new improved REPLICA 3 from Clares is a very powerful disc based TAPE to DISC Utility. It now transfers even more programs than ever before. Replica 3 will not work with all programs but then neither will anything else. 30,000 Replicas have been sold to date. It has to be good.

£15 (40 or 80 track)

Acorn's Speech Synthesiser package, complete
Special Offer £18

APOLLO

The NEW Modem from Watford

Following numerous requests from you, our discerning customers for an APPROVED, Low Cost & High Performance modem with Auto Dial & Auto Answer facilities as standard) we bring you the versatile APOLLO Modem. Just compare the features and look at the price (which incidentally includes the cost of the Software, manual and BBC connecting cable). We are sure you will agree that Watford Electronics in their traditional way are giving you a super 'value for money' deal.

Just look at these features:

- V21 for Bulletin boards, Microlink, Telecom Gold, etc.
- V23 for Prestel, Home Banking, and other Viewdata services.
- Reverse V23 allows User run Viewdata service.
- 1200-1200 half duplex for communications.
- XMODEM, HEX and ASCII file transmission.
- Auto Dial of given 'phone number.
- Auto Answer for User's Bulletin Board.
- 80 column terminal with split screen facility.
- Prestel text screen dump.
- Fully BABT approved.
- **FREE Registration to MicroLink.**

The Apollo is attractively finished in matt black. It opens the doors to world communication to both, the Hobbyist and the Professionals alike. With baud rates varying from 300/300 Originate and Answer, 1200/75 and 75/1200 full duplex and 1200/1200 half duplex, virtually all the popular tele-services can be accessed. A comprehensive Comms ROM oversees the use of the APOLLO, providing simple commands for all the software controlled facilities. APOLLO is an ideal modem for both the first time buyer and the seasoned user. Join the Telecommunications Revolution – Buy a Watford APOLLO!

Only: **£82** **(Carr £3)**

Price includes, the Modem, Comm Software Cables & Operating Manual).
(Write in for full specification)

VOLTMACE JOYSTICKS

Delta 3B Single Joystick	£10
Delta 3B Twin Joysticks	£15
Delta 3C Joystick for Compact	£10
Delta 14B Single Joystick	£11
Delta 14B/1 Adaptor Module	£12
Transfer Software Disc-Tape	£7

ATTACHE CARRYING CASE

For the BBC Micro. Attractively finished in antique brown leatherette. Lockable.
Only **£10** (£2 carr.)

Versatile **BEEB SPEECH SYNTHESISER** Unit



The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £2)

Continued →

COMPUTER CONCEPT'S ROMS

ACCELERATOR	£30
CARETAKER Basic Utility	£23
DISC DOCTOR	£28
Graphics ROM	£29
TERMI	£25
COMMUNICATOR	£49
Printmaster	£24

Wordwise £23

Wordwise plus £40

We are giving away absolutely **FREE**, the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear text-segment area.
- BBC B, B+ and Master compatible.

Only £24

(N.B. Word Aid requires a Disc Interface in your Micro)

HI-WORDWISE-PLUS DISC: £5

SPELL MASTER £42

Inter SHEET ONLY £37

INTER CHART ONLY: £25

Inter-WORD £36

MEGA-3 ROM

Interword, Intersheet & Interchart – 3 in one ROM £76

INTERBASE £49

All Prices Exclusive of VAT

VIEW

VIEW WORDPROCESSOR 2.1	£35
VIEW 3.0 ROM	£48
VIEW PROFESSIONAL	£59
HI-VIEW (for 6502 2nd Processor)	£36
VIEWSHEET (Acornsoft)	£36
VIEWSTORE	£36
VIEWSPELL with 80 track disc	£29
VIEWPLOT Disc (Please specify for Master 128 or Compact)	£20

CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

VIEW-INDEX	£12
OVERVIEW Packs 1 & 2	£69

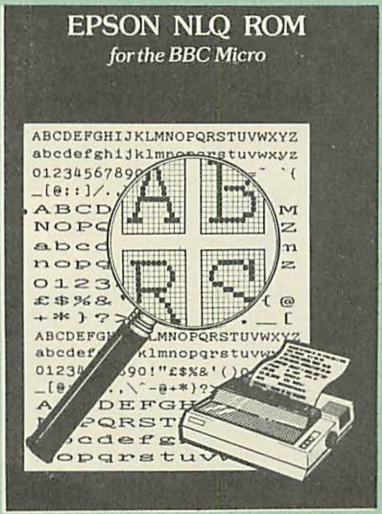
Watford's own Sophisticated VIEW PRINTER DRIVERS

Epson FX80 & Kaga KP (Disc)	£8
Juki & Brother HR15 (Disc)	£8
Silver Reed Printers (Disc)	£8

MINI OFFICE II

DISC Version for BBC B & B+	£14.00
DISC Version for BBC Master	£16.50
ROM Version	£43.00

(When ordering please specify for which Micro & 40 or 80 track Disc).



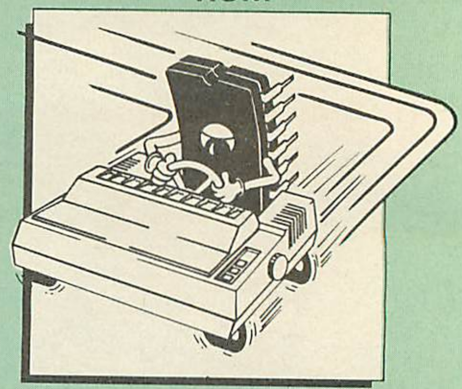
Harness the full potential of your Epson RX or FX printer. The NLQ ROM makes Epson printers produce Near Letter Quality output with optional proportional spacing, enlarged and underlined. Accessed by simple * commands from Basic, Wordwise and View (with driver) or almost any other language.

(Send an SAE for sample printout)

Only: £25

VIEW PRINTER DRIVER for NLQ ROM £7

VIEW PRINTER DRIVER ROM



View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing only at a small outlay.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

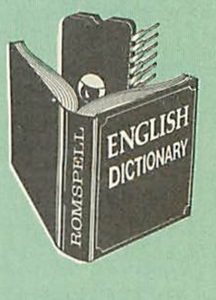
Other printers are readily supported by defining a Printer Driver using the built in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redefinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute * command when printing.

Other features include a very powerful on screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips. (Write in for a detailed leaflet).

Price: Only £33

ROM-SPELL

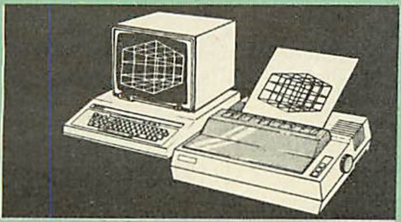


Probably the most advanced and fastest spelling checker available for the BBC Micro. Compatible with View, Wordwise and Wordwise Plus ROMSPELL is simple to use with easy editing of incorrect words. Full facilities for editing the user dictionary to allow customisation to your personal needs. Dictionary includes over 30,000 words and is supplied with a Comprehensive manual.

NOT compatible with 1770 DFS.
(Please state 40 or 80 track disc)

Price still only: £25

DUMPOUT 3



A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including full Mode 7 graphics.
Also provided are window setting utilities and OSWORD calls to plot and read Mode 7 graphics pixels.

Facilities:

- Vertical and horizontal scaling in all graphics modes and mode 7
- Rotation of image by 90, 180 or 270 degrees
- Left hand margin setting
- Screen dump window setting
- Colours appear as grey scale
- Two tone fast dump
- Colour mask
- Mode 7 contrast expansion
- Mode 7 contiguous dump
- Key triggered and User Port triggered dumps

The Micro User Feb. 1985.
'Without reservation I wholeheartedly recommend the Dump Out 3 ROM as the ultimate screen dump facility for the BBC Micro . . . it must represent excellent value for money and surely cannot be beaten".

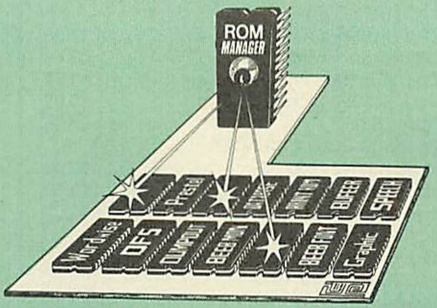
For use with the following printers:
GLP, GP80/100/250, CANNON, STAR, KAGA/TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, M1009, NEC PC8023, DMP100/200/400, Panasonic KX1081/82, Mannesman Tally and compatibles.

Only: £25

BBC SOFTWARE'S Popular Educational Software

- Maths with a Story 1 (Disc). 4 primary level maths programs **£11.25**
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- **Introducing Geography 11-17yrs** **£17.50**
- Electric Fields 6-14 years **£11.25**
- BlackQueen Contract Bridge **£13**
- Espana Viva – 3 Discs **£19.95**
- A Vous La France Disc **£21.50**

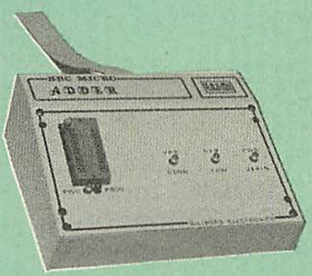
ROM MANAGER



Take control of your Sideways ROMs with ROM Manager. This powerful utility ROM gives you power over your sideways ROMs. Disable whole ROMs, send commands directly to named ROMs and many other powerful facilities.
"Provides comprehensive management of all your installed ROMs". (BEEBUG November '84.)

ONLY £20

ADDER



The only low cost EPROM Programmer for the BBC Micro that will program both the standard 21V and the new 12V5, 27128 EPROMS.
Adder is the ultimate EPROM programmer for the BBC Micro. It will program many different EPROMs up to the very latest 27256 32K devices.
The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.
The Adder software provides sophisticated facilities for programming EPROMs from a RAM image produced by loading disc files. The software is menu driven and designed for ease of use.

Features:

- Two ultra fast programming algorithms or standard slow algorithm.
- Supports standard 21V programming and newer 12.5 volt EPROMs. (Software switched).
- The RAM image to be programmed can be built up in many ways. Sections of image can be loaded separately. Part programming. Read EPROM. Edit data in memory.
- Automatic processing to handle a list of files to program into the EPROM.
- Automatic disc buffering to allow programming of 32K 27256 devices from a 32K file without extra effort.
- Verification gives detailed error list and checksums are maintained. There is also a blank check facility.
- Works with all standard filing systems. Generates header code for RFS ROMs to allow Basic programs etc. to be stored in EPROM. More than one file per ROM permitted.
- Programs the following EPROMs: From 2K to 32K: 2516, 2716, 2532, 2732, 2764, 2764A, 27128, 27128A, 27256 (Both 12.5V and 21V).

£75 (£3 Carr)

TEX EPROM ERASERS

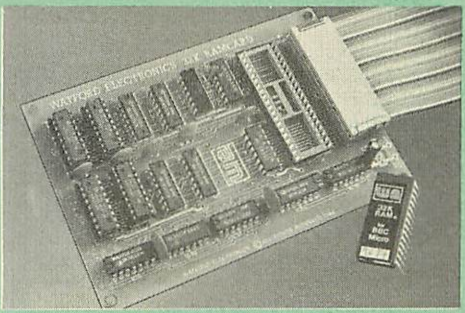
EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.

- **ERASER EB** – Standard version erases up to 16 chips. **£28** (carr £2)
- **ERASER GT** – Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£30** (carr £2)
- Spare UV tubes. **£9**

32K

SHADOW RAM- Printer Buffer

Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16K or even 20K, but a massive 32K of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.

- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.

- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24K of text in memory. This product is recommended as an ideal complement by Computer Concepts.

- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20K of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28K of program space.

- Use the FULL 32K or the bottom 12K of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS423 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138,145,ADVAL etc). Please note only a 12K printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.

- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Only £59 (carr £2)
(Price includes a comprehensive manual and the ROM)

INCREDIBLE WORDPROCESSING DEAL

Watford's 32K SHADOW RAM CARD and Computer Concept's INTERWORD Wordprocessor package.

at Only **£89** (carr £2)

Continued →

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It features information about:

- Memory Organisation
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- Disc Filing Systems
- ANFS
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- Comprehensive appendix on 65C12 instruction set

At the rear of the manual there are pull out circuit diagrams for the Master 128K. A worth-while addition to any Master owner's library.

All this for just £19 (NO VAT)

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"Why has no-one written a book like this before? It's long overdue".
If you own a BBC-B, BBC B+, Electron, Master 128, Master Compact or Archimedes then this book is for you. It shows you how to get the most from your computer, and how to make the computer work for you. Although some sections are machine specific, most of the information, programs, hints and good solid experience are for the whole range of BBC machines. The general style and level means that both beginner and expert will feel satisfied with the quality and quantity of the material.

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This 415Ml, king size multi-purpose foam cleaner spray is ideal for cleaning the Keyboard, Monitor, Disc Drive and your computer furniture surfaces. Simply spray on the surface to clean and wipe off with a clean cloth.

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Aerosol Dust Spray
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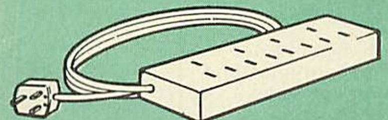
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Protection for only **£7.50**

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4 way top quality mains trailing sockets. Supplied wired up with mains plug ready for use. Can be screwed to floor or wall if required. Very useful for tidying up all the mains leads from your peripherals.

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ROM EXTRACTION TOOL

This extremely useful tool allows you trouble free chip insertion and removal from your computer by distributing the removal force over the whole body of any 24 or 28 pin chip.

£2

Replacement FLEXIBLE 17 way Keyboard Connector £3

28pin DIL HEADER PLUG

SOLDER type **£1.50**; IDC CRIMP type **£1.95**

8 WAY DIP SWITCH

Increase the speed of your Disc Drives by soldering this switch to your BBC B or B+ Keyboard.

Only **£1.00**

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Convert two single Disc Drives into one Dual Drive with this simple external unit (Suitable for Disc Drives with PSU. For Disc Drives without PSU, you will also require Watford Power Duck, see below).

£14

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(All ready made and tested)

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DISC DRIVE POWER LEADS
Supply from BBC power supply to standard Disc Drive connector.
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BBC to Disc Drives Ribbon Cable
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65C12	£9.00
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74LS10	25p
74LS123	80p
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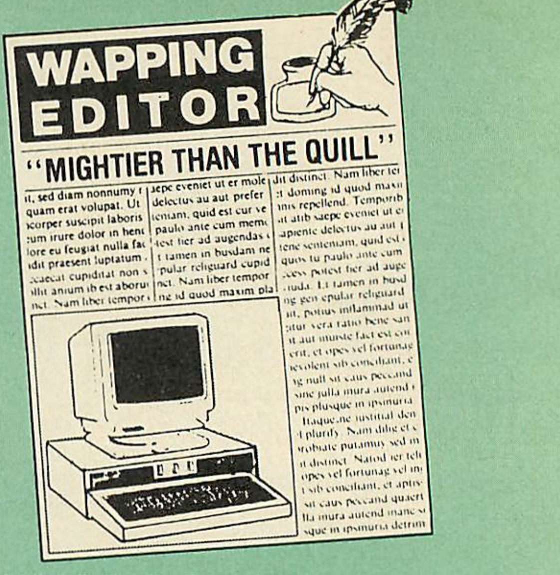
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GRAPHICS PACKAGE

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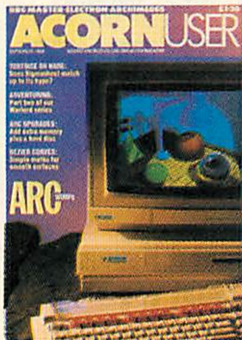
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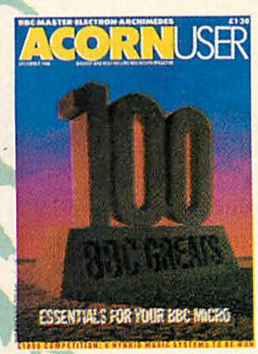












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BUTTONING UP A NEW CONCEPT

Want to keep your BBC micro, but also want a Hypercard-like visual database? User Card is just what you need

Joe Telford

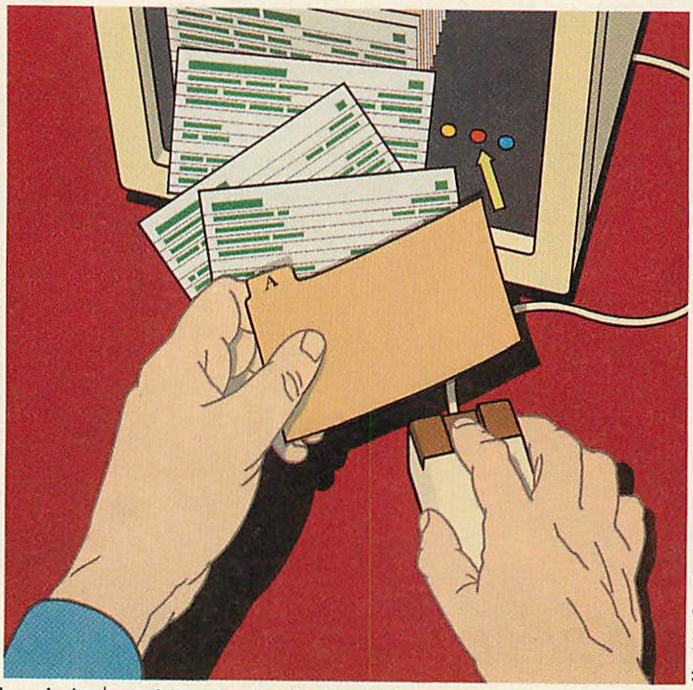


ILLUSTRATION BY ROBIN MacFARLAN

I suppose it happens to all of us at sometime or other. Changing jobs, I mean. I've watched over the years as *Acorn User* staff have come and gone, and although I only contribute to the massive workload for the real *Acorn User* team, I've just come to understand the tremendous upheaval that changing jobs entails.

All sorts of new relationships must be made, structures for working established and mechanisms for doing the job as part of a new team invoked. You'd think that the sensible application of a computer could only help matters. Far from it. In my previous post, I used BBC micros which I myself had recommended, and more recently, their brother Arcs. These machines covered much of what we needed to do, and could be used easily by most of the staff.

Now, however, my needs are very different. I still need to use BBC micros for some of my work, particularly in the area of control and interfacing (so look out for some really exciting projects!), but there are also areas where my team needs to deliver a high-quality paper-based end product.

Then there are areas where we need to communicate among ourselves, and share applications, activities and files, and then areas where a totally integrated environment encompassing all the necessary applications is essential. If we take into account the fact that not all of us are computer experts, then we have a major problem in deciding which system to use for admin work.

This is the situation that I'm just exploring, and I've spent the past few months looking at potential systems. Finally I've settled on the Apple Macintosh SE as a networkable system that fits most of our needs at work, and by the time you read this the system will be up and running.

I must admit that I would have liked to have bought Arcs, but even now they do not deliver the range of applications that we need to access.

Perhaps with the imminent release of RISC OS, software writers will at last be encouraged to use a compatible approach which will enable integration across a wide range of products: this is certainly the intention of *Arc Edit, Arc Draw* and *Arc Paint* on the RISC OS Welcome disc.

When the world first heard of Windows, Icons, Menus and Pointers (Wimps) there was an immediate move towards programs incorporating these on almost every micro. But not every micro was capable of supporting the complete integration of such applications, which were often quite large consumers of memory. In addition, every software house attempted different implementations, based on what individual programmers saw as being most appropriate to their application. Rather than create a uniform means of communicating with a computer, avoiding the need to relearn for every new package, the learning environment of many computers is so un-intuitive that a manual is an essential part of learning how to use every application.

PAB is a new word which needs to be applied to the Wimp environment. The PAB is a Pointer which Acts on a Button. In other words, it is most important to communicate simply with an application, and the simplest way is to have a series of buttons available on screen, which are pressed by pointing at one and then clicking a mouse or the Return key. A pressed button carries out a particular action.

This sort of human-machine interface allows us to work with very simple tools: a mouse or the cursor keys, the screen pointer and the Return key or one button on the mouse.

It all means that your attention can be devoted to the application, and not to considering what button to press. In a mouse-based application, you would simply point and press to start an activity.

Contrary to popular opinion, the optimum number of buttons on a mouse, using the PAB philosophy, is just one. You might think that a two-button mouse would allow you to work twice as fast as a one-button mouse, but that is not really so. Because each choice of button to be pressed makes you think about an operational technique as well as the aim of your activity, the amount of thinking to be done is greater. Consequently, you work somewhat slower than with a single-buttoned mouse.

The standard BBC mouse with three buttons is even worse, because you now have to make three choices at each point resulting in a further reduction in working speed and an increase in button presses. The logical extension of the three-button mouse is the 72-button mouse – more usually called a keyboard. We all know how quickly this allows us to work. The best tip I can give is to tape off the spare keys, and use applications which give you all the information you need on screen, in menus or on buttons. Programmers shouldn't differentiate between mouse buttons.

This might be anathema to those of us who are deeply attached to one particular package, such as AMX *SuperArt,* and who have learned to use all the mouse keys and special sequences from the keyboard. My feeling is that you should always work at whatever level you are confident, but never assume that the effort put into learning one package must be repeated when learning another. As more powerful computers like the Arc arrive, the emphasis should be on ease of use, and PAB may be a way forward.

A year or so ago, Apple came up with *Hypercard,* now given away freely with its Mac. Explaining *Hypercard* is about as easy as explaining Logo.

At its simplest, *Hypercard* is a means of relating large amounts of separate information in a visual form. It is also a particularly good example of the PAB philosophy, and well worth exploring. Of course one of the problems of being an Acorn user is that large applications are often beyond our ability to duplicate in our 32k RAM space. *Hypercard* can just survive on a one-megabyte hard disc machine. However, there are generic elements of *Hypercard* which are quite simple, and I've spent some time developing a demonstration package to run on most BBC micros.

As with any new concept, you have to learn a new vocabulary. The main new word here is the 'stack'. A stack is simply a pile of database cards about a particular topic. The card itself is a container for information, just like an index card in a filing system. Each card contains different types of information, as shown in figure 1. Each card carries not only information about its own shape and size but also about the text for different areas, plus fields for further information. There can also be picture information and menus for special effects but they aren't implemented in our own version – *User Card.* There are also buttons on the card to

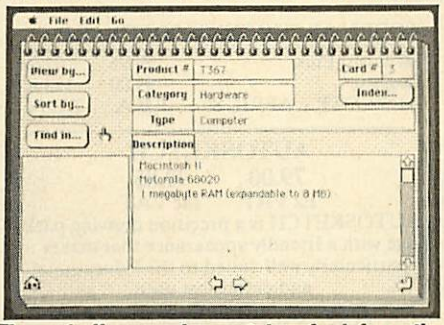


Figure 1. *Hypercard:* a container for information

cause specific actions. The user should be able to change the information on any particular card, but because we are working with a specific database in our demonstration version, the ability to do this is switched off.

Another important word is background. This refers to the base layout of each card, and in our version this is set by having each card refer to a particular background as part of its information. The background can include text, fields and buttons. Fields are the areas on a card where text can be entered; buttons are those which can cause particular actions to occur.

This version of *User Card* can handle a range of about 15 button actions, and later versions will allow you to predefine buttons and their actions. This is tantamount to programming, but without any of the learning associated with languages like Basic and Logo. In fact, we call the activity of making a set of cards 'authoring'.

The Enos stack is the demonstration stack accompanying this article. You can find it on the yellow pages as two programs. The first is a stack generator: a program that builds the stack on disc which should be typed in and saved as 'Makestk'. The second program reads the cards and manipulates the stack. This package is quite flexible and will work with any stack, although it does not yet create any new cards. Type in this program and save it as 'Dealer'.

Both programs are quite long, and there may be some benefit in buying the monthly disc.

The Enos stack covers a selection of E numbers and food additives, and so is of interest to people from health-conscious adults to students of Home Economics studying for GCSEs. The information contained on each card comes from a range of sources, particularly the leaflets available from health food chains like Holland & Barrett. Each card carries the following information:

- The E number, for example E100
- Whether the E number has caused reactions in hyperactive children
- The name of the additive
- Which foods it is typically found in
- What the additive is used for
- Any known dangers to health
- Any comments you wish to include which don't fit elsewhere

Once the programs are safe on disc, format a new disc to either 40 or 80 tracks and have it handy. Load the Makestk program from its disc into the BBC micro, and then place the blank disc in drive 0. Run the program and wait until it finishes and the disc drive light goes out. Now copy the Dealer program from your disc onto the disc with the newly created stack, and then create a !Boot file:

```
*BUILD !BOOT
0001 *BASIC
0002 CHAIN "Dealer"
0003
Escape
*OPT 4 3
```

At this point, you have created a disc which will operate as a stand-alone stack of up to 29 cards – the limit is the number of files on a DFS disc less !Boot and Dealer. To increase stack size you will need either to adopt a new method of storing card information, or to change to a hierarchical filing system. In common with the real versions of similar products, ADFS on a Winchester drive really is the best bet for a more rigorous implementation of this package.

Once the disc is set up, you can start to get into the stack. To access the E numbers stack, simply press Shift and Break, and the program Dealer will load.

There is then a brief pause while it installs a small piece of machine code (which dumps cards to an Epson printer), and soon a window appears which prompts for the name of the stack.

Simply do as requested. The stack is called Enos, so just type that in and press *Return*. If you want to look at the disc, for example if you have created a new stack and you want to see if it is present on a particular disc, then instead of entering any name, just press Return and the disc will be catalogued. A window at the top of the screen tells you to press Space to return to the main program – once you've read the catalogue, do this.

Once the stack name has been entered, the program looks for the stack and loads the first card for that stack. Although it's not strictly correct you can call this card the Home card for the stack. It has special options available on it, and it contains a title for the stack.

Now you can begin to use the ideas of PAB. Figure 2 shows the Home card for the Enos stack. Normally, the pointer on screen is tied to the cursor keys. Try them and the pointer will move in the direction of the cursor keys pressed. The Return key acts as a single mouse button. Moving the pointer anywhere on the screen and pressing Return results in either an action (if we've pressed a screen button), or nothing if there actually is nothing to 'press'.

Notice the two buttons at the top of the card, labelled Mouse and Keyboard. These buttons can change the input device from cursor keys plus Return to a mouse where only the leftmost button is active. The mouse driver chosen is my own favourite – the Acorn VFS chip, as used on the Domesday system.

It's a pity this chip isn't more easily available, because it would certainly encourage more people to investigate Wimps. If this chip is installed then moving the cursor key pointer to the button marked as 'Mouse' and pressing Return removes the cursor key input and transfers control to any mouse attached to the User port. If you don't have the VFS chip, then the program in listing 3 allows you to use an AMX-type mouse.

The rest of the instructions apply to the mouse versions as well as to the cursor key version of software. The expression 'Click' simply means either press the leftmost mouse button, or press Return, depending on what you use.

Take a look at figure 2. There are five buttons available to be pressed by your pointer:

- The 'Exit' button
- The 'First card' button
- A 'Print this card' button
- A 'Print all cards' button
- A 'Change stacks' button

To select any button, simply move the pointer to that button and click. Clicking on the Exit button will give a message asking you to confirm that you do want to leave the *User Card* stack. Click again to do this or hit Escape to cancel. Exit from the *User Card* stack is back to the Basic language.

The first Card button has a simple icon at the front < <, which is reminiscent of the rewind button on tape-recorders. Simply click on this key to go to the first card in the stack.

Click on the 'Print this card' button for a fast screen dump of the card currently on screen. In this case, it's the Home card, but any card with a 'Print this card' button can be dumped on an Epson-compatible printer. A warning message to set up the printer appears, and when action is re-clicked, the card is dumped to the printer. If the printer is not set up, then the system can hang, and the only way out will be via the Break key. The Escape key will abort this action right up to the last moment, after you confirm that the printer is set up.

The 'Print all cards' button issues the same message as the previous one, and you must decide whether to use Escape to cancel its action, or set up the printer and re-click. Once the action is confirmed, all the cards in the stack are printed – this takes a little while. The cards are printed exactly three to a sheet of 66-line fanfold paper, so make sure the first one starts near the top of the paper.

To change to another stack, the 'Change stacks' button restarts the Dealer

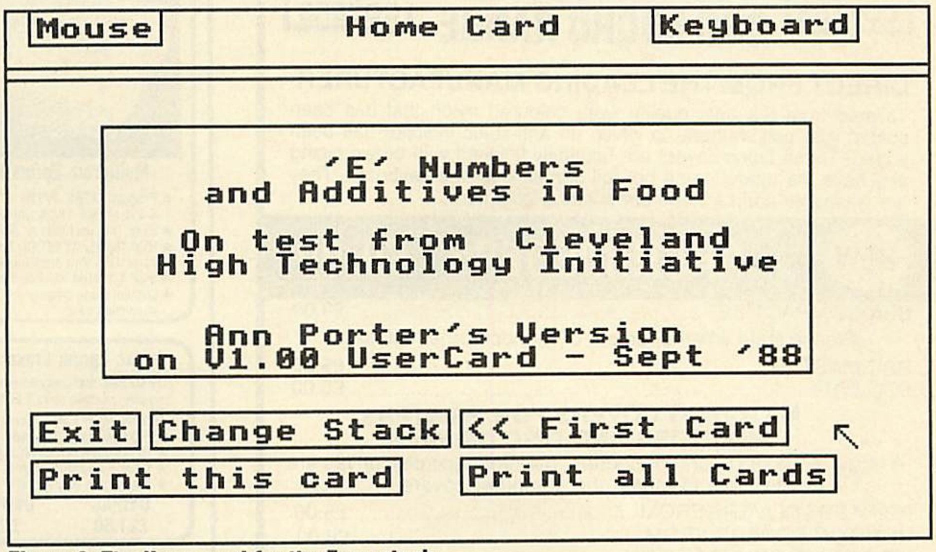


Figure 2. The Home card for the Enos stack

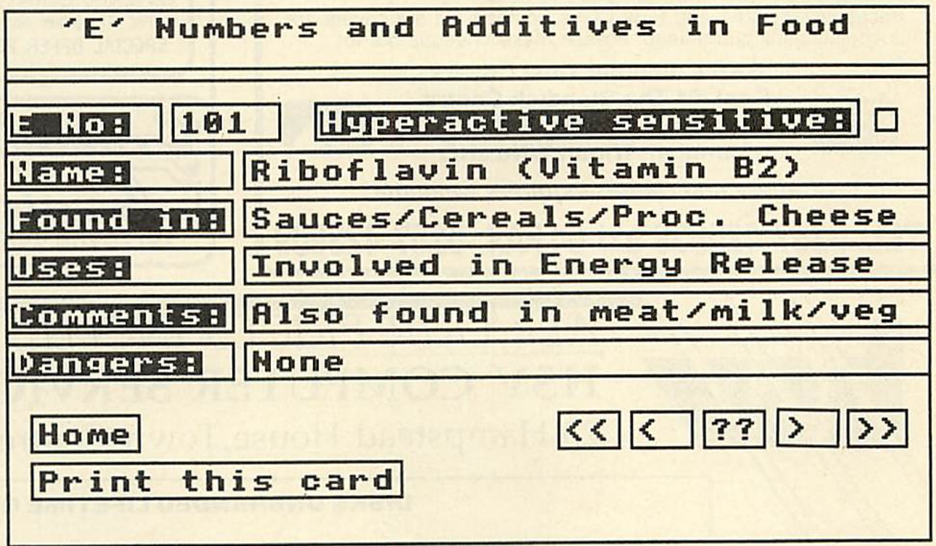


Figure 3. Typical information card with its seven buttons

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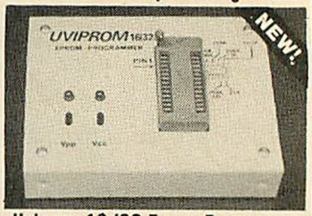


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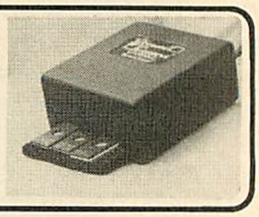
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Access

program and prompts you for a new stack name. This is of limited use at this moment, because you have only got one demonstration stack.

There are a number of other buttons which are common to all the information cards in the stack. An information card is shown in Figure 3, with its buttons: Home, Print this card, First card, Previous card, Next card and Last card, plus a Find card button. The Home button simply takes us to the Home card. The Print this card button and the Goto first card button have already been covered.

All the Goto buttons are redesigned as brief icons. The First card icon is the < < shape and the Last card is indicated by > >, again common to some tape recorders. Clicking this button takes us to the last card in the stack.

The Goto next card button has a forward icon, >, which moves you on one card whenever it is clicked. At the end of the stack, a warning message appears and forward movement stops.

The Goto previous card button has a reverse icon, < moving you back one card whenever clicked. At the beginning of the stack, a warning message appears and movement backward stops.

The Find card button has a ?? icon. When it is clicked on, it moves you to a card that allows you to find other cards by specifying part of their contents. Once clicked on, a new card appears with four buttons, as shown in Figure 4:

- The Home button
- A 'Brief' radio button
- A 'Find matching cards' button
- A 'Print matching cards' button

The Home button works as normal, but the other three require explanation. We click on the Find matching cards button to get a query window asking for some text to search for. Once the text is entered, and Return pressed, the stack is searched from the first to the last card for any occurrences of the text. It is very important to type exactly what you are looking for. For example: 'Jelly' will find the word Jelly and not Jellies, while 'Jell' will find both Jellies and Jelly, and 'ell' will find Jellies, Jelly and Yellow.

As each card is found it is displayed on the screen and can be read. To move onto the next matching card, simply click again. At the end of the search, the final match is left on screen. If no match is made, the card from which the search was started is displayed. A search can be cancelled by pressing Escape at any time.

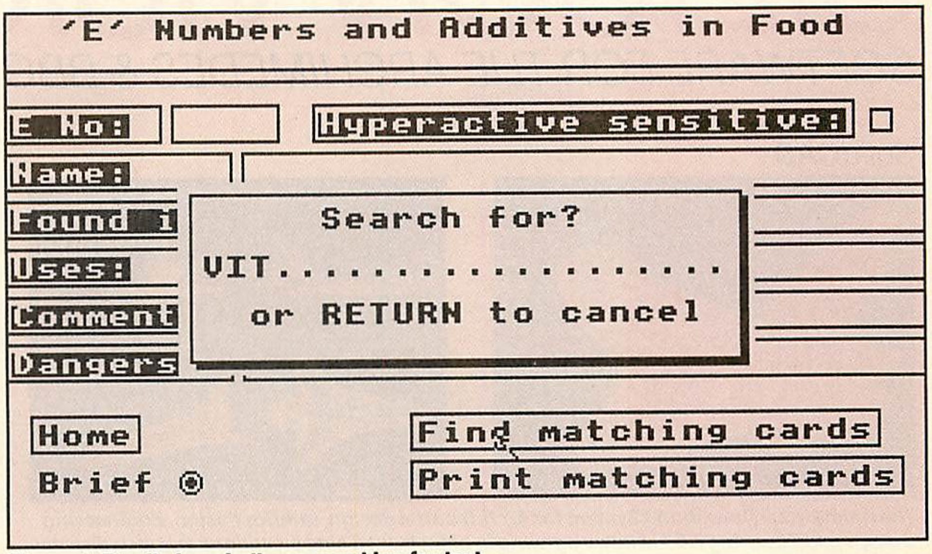


Figure 4. The find card allows searching for text

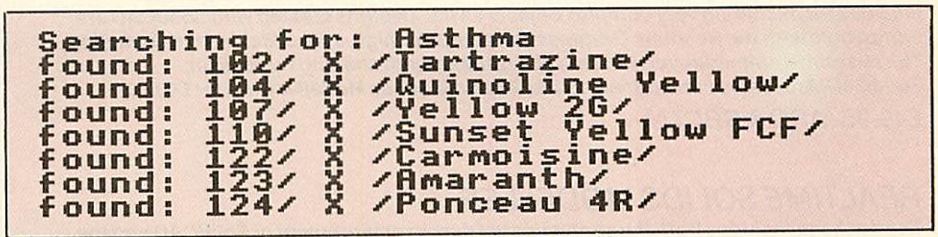


Figure 5. Results of a brief search: part of each card is listed

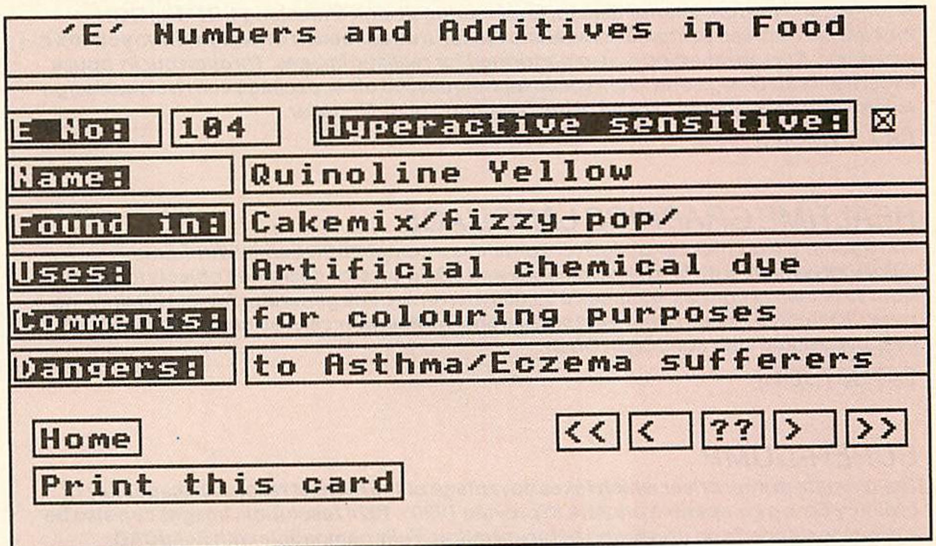


Figure 6. All matching cards are shown in a full search

The Print matching cards button behaves in the same way as the Find cards button, except that all the matching cards are dumped to the printer as they are found. Have the printer ready to go before confirming this button's action.

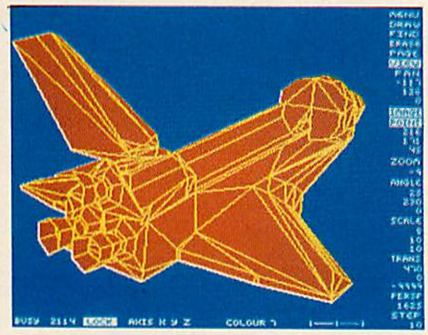
The Brief button is called a 'radio button' because of its shape and action. It is set 'on' when its active area is clicked. It then stays on until the button is clicked again. When the Brief button is clicked, searching via the Find or Print matching card buttons is carried out as normal, except that only the first three fields of each matching card are printed on screen or on the printer. This gives a table of the matching cards on which further searches can be based.

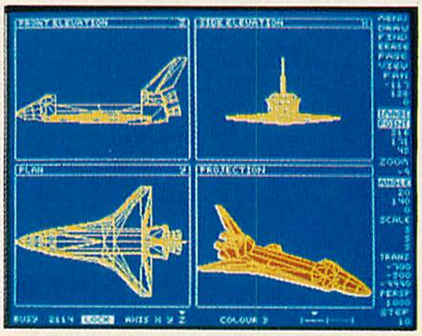
A more complete version of this stack, including many more additives, is available to schools from the Cleveland High Technology Initiative, Prissick Base, Marton Road, Middlesbrough, Cleveland.

If this demonstration stack interests you, then look out for a more general-purpose version soon, which allows the creation of new stacks and the linking together of cards for cross-referencing.

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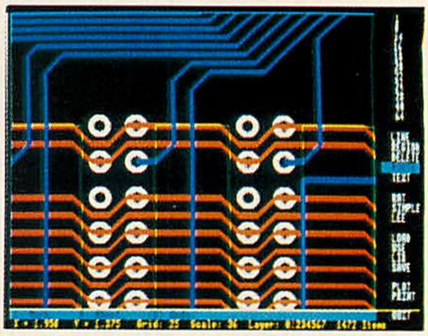
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STANDARD SETTING

We describe the more advanced functions that implementing GKS provides, relating to segments



Guy Martin and Gary Phillips

Segments allow you to collect a set of lines and text that produce an image on the screen. This whole segment may then be acted upon as a single object. Segments are like disc files, in that they can be opened, written to, read from, closed, deleted, or renamed. But unlike files, GKS segments can only be used as a whole; after you have created a segment, the individual line or text elements are not accessible.

A segment is given a name that identifies it uniquely. In this BBC Basic version of GKS, integers are used as segment names, the range 0 to SEGMAX-SEGMAX varying according to the available memory on your Archimedes.

Segments could be used to create a collection of objects in an application. As an example, for circuit board design, segments can be defined for various circuit board symbols: transistors, integrated circuits, a resistor, for instance. These symbols may then be placed on the screen at will. Segments are in contrast with sprites, as sprites are bit map objects, and so they cannot be easily scaled or rotated.

Segments are stored in Archimedes' main memory. The library does not know, in advance, how much memory it will require for segment storage so you need some method of memory management. The management routines must allow allocation of variable-sized chunks of memory, and subsequent freeing of that memory for using again by other segments. This corresponds with segment creation and deletion.

As you know at least something about what GKS will need to store in the memory, the memory management routines can be fairly simple. In fact, a block of memory is allocated for storage when GKS is opened.

A parameter is passed to the open_gks call specifying how much storage to allocate. This should vary depending on whether the library is being used on an A305, a 1 megabyte or 4 megabyte machine. This memory is divided among the segments as they are created, and a form of garbage collection occurs when a segment is deleted, to free the memory used by that segment.

The manipulation routines for segments are given in table 1. They are analogous to file creation (open), close, read, delete and rename functions.

Consider a situation where the program wants to create a symbol to be used later on. The following fragment shows how this is achieved:

```
create_segment (segment_name)
close_segment ()
delete_segment (seg_name)
rename_segment (old_segment_name, new_se
        gment_name)
insert_segment (segment_name, transforma
        tion_matrix)
redraw_all_segments_on_workstation (work
        station_id)
```

Table 1: manipulation routines

```
create_segment (1)
polyline (num_points_part1,symbol_part1_
        x(),symbol_part1_y())
polyline (num_points_part2,symbol_part2_
        x(),symbol_part2_y())
close_segment()
```

The call to create_segment causes all subsequent output primitives to be stored in the first segment until the call to close_segment is issued. The primitives are also drawn on screen in the usual way, according to the current window, viewport, and clipping settings. The two calls to polyline after the create_segment call, cause two sections of the symbol to be stored in segment '1'. The segment is then closed. Any further output primitives will not be stored in this segment, but will just go to the screen as usual.

Only one segment may be open for output at any one time; you cannot have nesting. The second segment can only be opened after the first is closed.

But suppose you wished to create a new segment that incorporated all of the parts of segment 1, plus some other lines and dots. Look at the following code fragment:

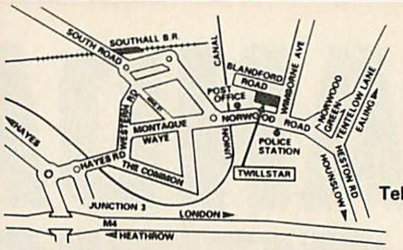
```
create_segment (2)
polyline (num_points_part3,symbol_part3_
        x(),symbol_part3_y())
insert_segment (1,transformation_matrix)
polyline (num_points_part4,symbol_part4_
        x(),symbol_part4_y())
close_segment ()
```

The create_segment call creates a new segment 2 ready to accept output primitives. You then call an output primitive (polyline), and start the new segment. Insert_segment is then called giving it the parameters, segment 1 and a transformation matrix. This has the effect of adding the first segment to the second.

It is possible to apply a transformation to the symbol in segment 1 as it is copied across to segment 2 as will be shown later. Finally, another output primitive (polymarker) is called and the new segment is closed.

ILLUSTRATION BY BENOÎT JACQUES

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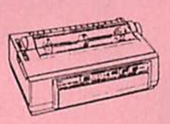
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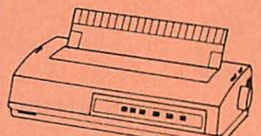
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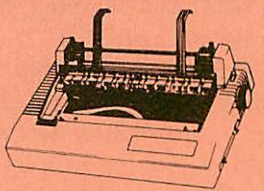
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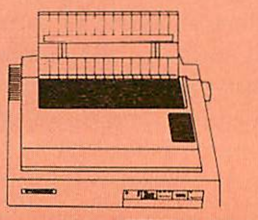
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PRINTERS

Manipulation functions

The create_segment routine tells the GKS library that you wish to create a new segment. The parameter is the segment name, and an error occurs if a segment is already open, if a workstation is not active, or if a segment of that name exists. Otherwise subsequent graphics drawing will be stored in the segment.

To inform the GKS library that you've finished writing graphics to the current segment, use close_segment. No name is required as a parameter, as only one segment can be open at any time.

Delete_segment asks the GKS library to throw away any information relating to the segment name specified, thus freeing the memory for new segments.

You can also rename a segment, even if it is currently open. The rename_segment call takes two parameters, the old segment name, and the new one. An error occurs if the old segment doesn't exist, or the new segment already exists.

```
Attributes
set_visibility (segment_name,visibility)
set_segment_transformation (segment_name
        ,transformation_matrix)
Utilities
evaluate_transformation_matrix (fixed_po
        int_x,fixed_point_y,shift_vector
        _x,shift_vector_y,rotation_angle
        ,scale_x,scale_y,coordinate_swit
        ch,output_transformation_matrix)
accumulate_transformation_matrix (input_
        transformation_matrix,fixed_poin
        t_x,fixed_point_y,shift_vector_x
        ,shift_vector_y,rotation_angle,s
        cale_x,scale_y,coordinate_switch
        ,output_transformation_matrix)
```

Table 2: functions affecting segment display

The insert_segment copies drawing primitives from the named segment into the currently open segment. A transformation is applied to the whole copied segment as it is inserted. For convenience, there is an identity matrix already defined, called IDENTITY_MATRIX, but this is not a part of standard GKS. This inserts a segment without any changes. The call takes two parameters, the name of the segment to insert, and the transformation matrix. The copied segment remains unaffected.

With the redraw call, you redraw all the segments stored: with the viewing surface being cleared first. An error occurs if the workstation is not active.

Just as there are attributes that control the appearance of GKS lines, there are functions that affect the way in which segments are displayed. These functions are listed in table 2.

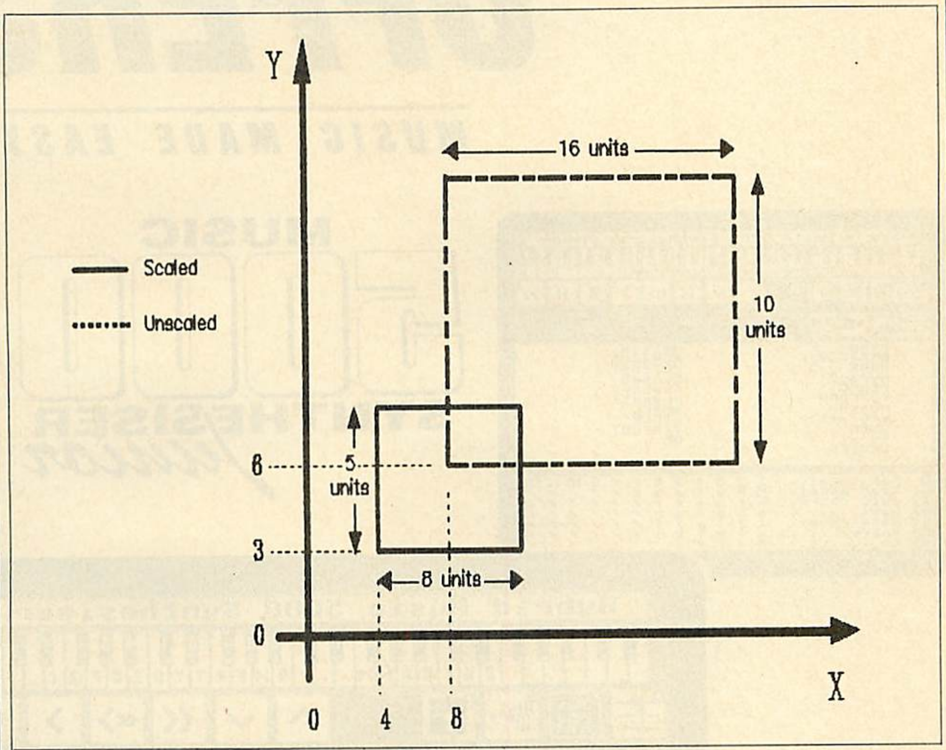


Figure 1. Scaling is performed relative to a fixed point

Consider a circuit board design package where you have circuit board tracks and components on the same diagram. It may be useful to see just the circuit board tracks – without the components. This can be done by making all the component segments invisible, like this:

```
REM set all components to INVISIBLE
for segname=component_start_name to comp
        onent_end_name
set_visibility (component(segname),INVIS
        IBLE)
next segname
REM now redraw the board tracks only
redraw_all_segments_on_workstation (acti
        ve_workstation)
```

The invisible segments are not lost, and may reappear at any time by setting their visibility attribute back to VISIBLE. Once segments have been set to INVISIBLE, redraw_all_segments_on_workstation will not redraw them.

Segment transformations

An example of a segment transformation could be moving a segment from one place on the viewing surface to another – a very common requirement. Consider the code fragment in table 3: this code simply moves the first segment 10 world co-ordinate units on the x direction, and five world co-ordinates on the y direction. The scale factors of one indicate that you do not want to change the size of the object. The co-ordinate_switch parameter may be set to 'WC', specifying the world co-ordinate system, or 'NDC' for the normalised device co-ordinate system.

The example uses the world co-ordinate system. The second lot of code in the box shows how to alter the size of a segment. The scaling is performed relative to a fixed point that may or may not be part of the object – as illustrated in figure 1.

This would have the effect of scaling the first segment to twice its original size (the two in both x and y scaling factors). The scale factors are just numbers, but you have told the function that the fixed point is expressed in world co-ordinates, so its meaning depends on the conversion between world, normalised and viewpoint co-ordinates.

Finally the transformation matrix can be used to rotate a segment about the fixed point. The segment rotation is expressed in radians, and the method is shown in part 3 of table 3.

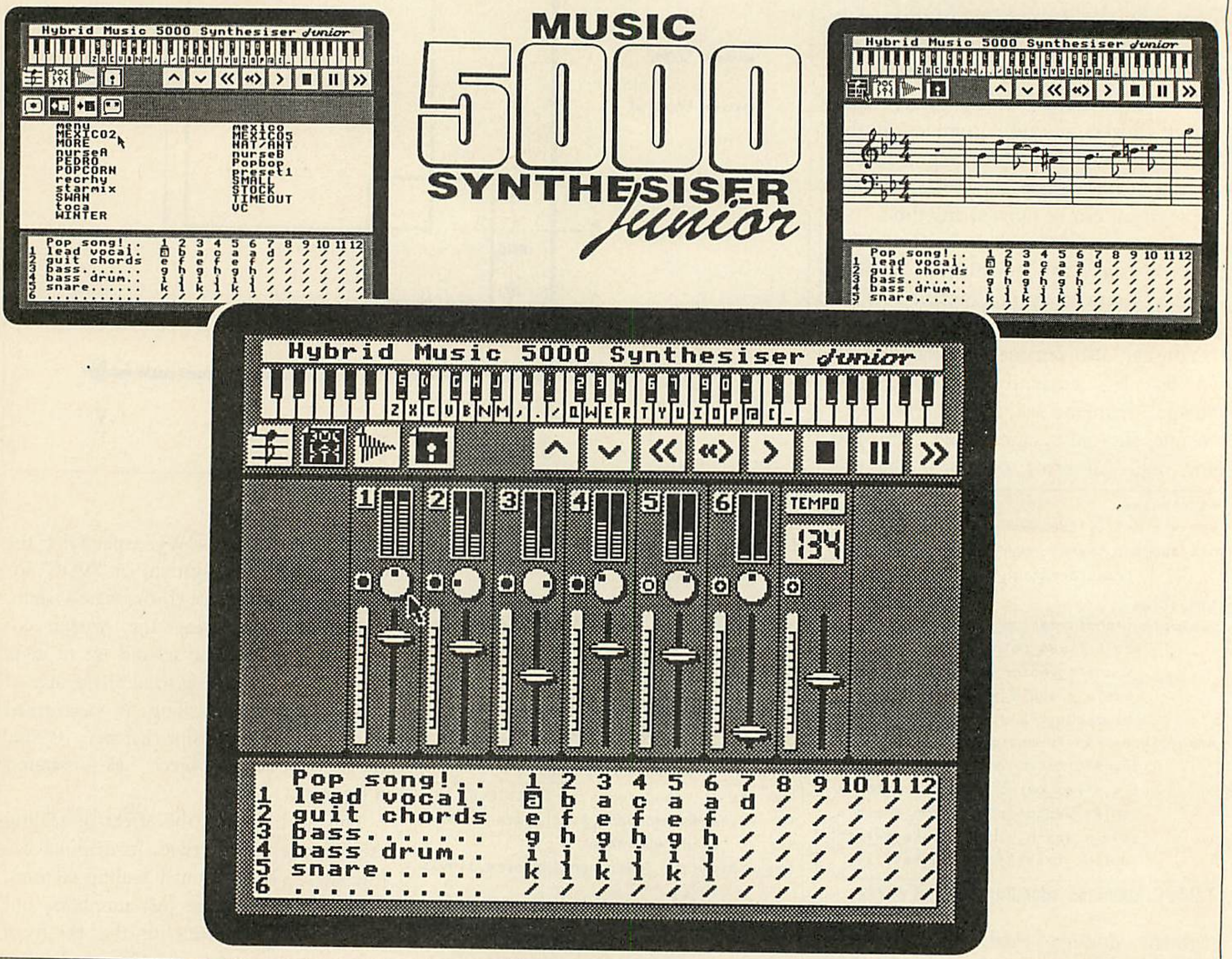
The examples keep the same fixed point in world co-ordinates, and it specifies a rotation of 90 degrees – it is converted to radians using the 'rad' function. Figure 2 shows how different fixed points affect rotation segment.

You can combine the scaling and rotating into one call to evaluate_transformation_matrix, and the last part of table 3shows how to shift, enlarge and rotate an object in one go.

The set_visibility function sets the

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visibility of a segment. It takes two parameters, the segment name and the visibility parameter. The name is an integer; the visibility parameter can only be set to VISIBLE or INVISIBLE. If the segment is currently visible, and is then made invisible, its image on the view

```
fixed_point_x=0     :fixed_point_y=0
shift_vector_x=10 :shift_vector_y=5
scale_x=1           :scale_y=1
rotation_angle=0   :coordinate_switch=WC
evaluate_transformation_matrix (fixed_po
        int_x,fixed_point_y,shift_vector
        _x,shift_vector_y,rotation_angle
        ,scale_x,scale_y,coordinate_swit
        ch,transformation_matrix())
set_segment_transformation (1,transforma
        tion_matrix())

fixed_point_x=20   :fixed_point_y=30
shift_vector_x=0   :shift_vector_y=0
scale_x=2           :scale_y=2
rotation_angle=0   :coordinate_switch=WC
evaluate_transformation_matrix (fixed_po
        int_x,fixed_point_y,shift_vector
        _x,shift_vector_y,rotation_angle
        ,scale_x,scale_y,coordinate_swit
        ch,transformation_matrix())
set_segment_transformation(1,transformat
        ion_matrix())

fixed_point_x=20   :fixed_point_y=30
shift_vector_x=0   :shift_vector_y=0
scale_x=1           :scale_y=1
rotation_angle=RAD(90)
coordinate_switch=WC
evaluate_transformation_matrix (fixed_po
        int_x,fixed_point_y,shift_vector
        _x,shift_vector_y,rotation_angle
        ,scale_x,scale_y,coordinate_swit
        ch,transformation_matrix())
set_segment_transformation(1,transformat
        ion_matrix())

fixed_point_x=20   :fixed_point_y=30
shift_vector_x=10 :shift_vector_y=5
scale_x=2           :scale_y=2
rotation_angle=RAD(90)
coordinate_switch=WC
evaluate_transformation_matrix (fixed_po
        int_x,fixed_point_y,shift_vector
        _x,shift_vector_y,rotation_angle
        ,scale_x,scale_y,coordinate_swit
        ch,transformation_matrix())
set_segment_transformation(1,transformat
        ion_matrix())
```

Table 3: coding for scaling and rotating

surface is erased. The segment itself still exists and can be made visible later.

When a segment is erased, holes can appear in the other images on the screen. If the other images are redrawn (with redraw_all_segments_on_work station) then these holes will disappear.

Visibility may be changed during the creation of a segment. Any output primitives that have already been produced will have their visibility changed. This

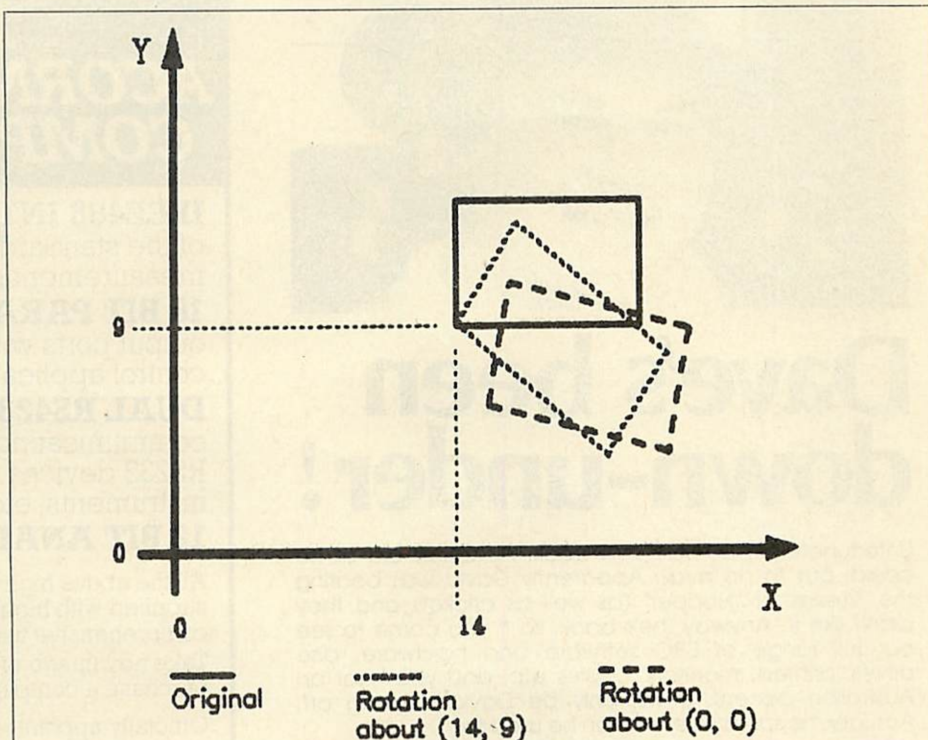
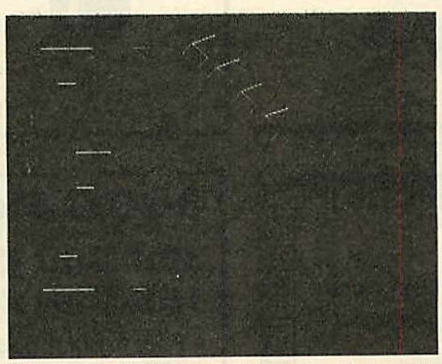
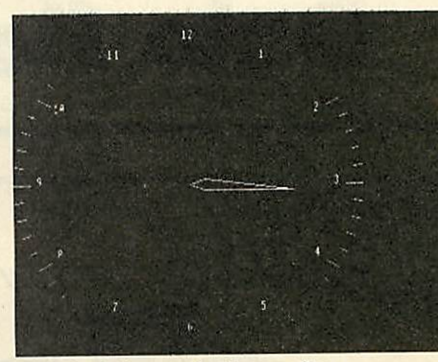


Figure 2. Different fixed points affect the rotation of a segment



The standard allows portable graphics programs



GKS clock demonstration on disc

is good for building up groups of symbols without them appearing on screen. The visibility of a segment would normally be set just after the create_segment call.

The parameters for the set_segment_transformation function are a segment name and a transformation matrix. The transformation matrix is an array two rows by three columns that may be set directly by the application, or made up by the evaluate or accumulation_transformation_matrix functions. Errors occur if the specified segment doesn't exist, or if GKS isn't in the proper state.

The evaluate_transformation_matrix call takes the hard work out of calculating a transformation matrix to use in the set_segment_transformation function – it takes no fewer than nine parameters. The first and second specify a fixed point for rotating or scaling about. The third and fourth specify a shift vector. The fifth specifies a clockwise angle of rotation in radians and the sixth and seventh specify separate x and y scaling factors. The eighth specifies the coordinate system that is used by the fixed point and the shift vector. Last is an output parameter – a matrix in which to put the output transformation.

Adding together separate transformations is made easier by the accumulate_transformation_matrix routine. It is near identical to the evaluate function, except that the transformation specified by the parameters is added to the input matrix before the result is returned in the output matrix. A rotation can be combined with a shift or a scaling operation, then applied in a single go.

Owing to lack of space, the growing GKS library listings cannot be carried in the magazine. There's a full commented copy on the 3.5-in monthly disc, a cut-down version on the 5.25-in disc, and a print-out can be obtained with an SAE from GKS, *Acorn User*, 26 Brunswick Place, London N1.



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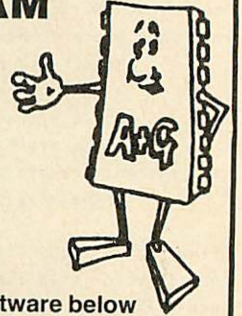
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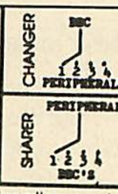
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SHOOTING GALLERY

Taking pictures of your favourite screens can be quite a tricky business. We have all the advice you need to be camera ready!

Graham Bell

Taking photographs of the computer screen is an important chore that needs to be done every month on *Acorn User*. And even with relatively simple equipment, it can be done quite well. You need no more than a camera on which you can control the shutter speed and aperture, and a really solid place to put your camera and monitor on. The method is exactly the same for colour, monochrome monitors or TVs, and for print or slide film.

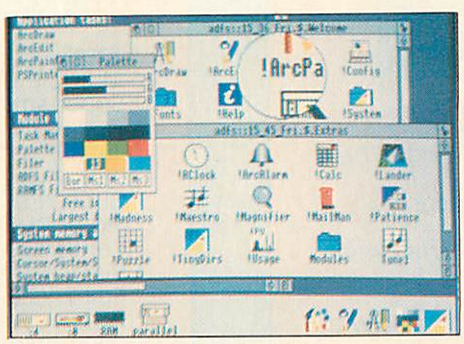
The major problem in taking a picture of any sort of TV or monitor screen is that, even ignoring any movement on the screen, the picture is not really static, because it is 'refreshed', or redrawn, 50 times every second. In the case of a TV, half the picture is refreshed 25 times a second. It is this that causes the flickering you often see on a screen – particularly out of the corner of your eye, or when computer screens are shown on a TV programme.

The computer's picture is drawn onto the screen by a moving dot of 'light' – it runs across the screen 256 times, gradually moving down, and it takes nearly the whole 50th of a second to run down the screen. The screen glows long enough after the dot has passed for you to see a steady picture, but it gets quite dull again before the dot comes around next time.

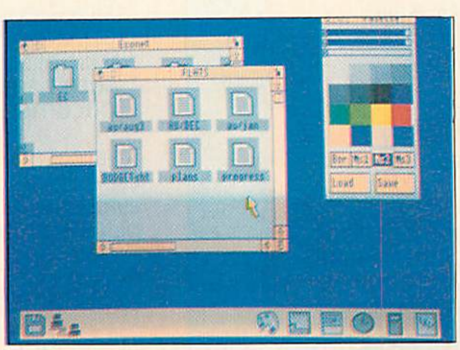
Many 'instamatic' or disc cameras take their pictures in a 30th or 60th of a second, so these can be ruled out for screen shots. As the shutter is only open for, say, a 60th of a second, not all the screen is 'refreshed' during that time. Part of it appears bright, but part appears dull because it wasn't redrawn while the shutter was open: the result is usually a picture with a black bar across it.



Underexposed: too small an aperture



Overexposed: aperture too wide



Dark bar due to too short an exposure time

So, you need a camera on which you can control the shutter speed. To get a really clear picture, a speed as slow as half a second is best, and down to about two seconds. If you use a speed slower than about two seconds, then funny things happen – the colours can change, for example. Professional photographers sometimes call this 'reciprocity failure'.

The remaining problem is that of how wide to open the aperture. If you have an exposure meter, then you can use that to check on the exposure. But many cameras have a built-in light meter, and you can often use that to work out how wide to open the aperture.

The way to do this is to set your monitor to display the picture much as you would use it normally, with the contrast fairly high and the brightness turned down to be comfortable enough to watch. Then get a completely white picture: the easiest way is to select mode 0, then type:

VDU 19, 0, 7; 0;

It is best to do this in a darkened room – you'll certainly need a blackout when you take your pictures.

Now point your camera directly at the screen, and use the meter to measure how much light is given off. You should set the shutter speed to say, half of a second beforehand, and also set the film type if you need to – some cameras do this automatically. It doesn't really matter how close you put the camera to the screen – a few inches away is fine.

With most monitors, the camera will tell you what it needs, say f16 to expose the film properly. Now this is for white; really the camera expects to be pointing at an average grey scene when you do this. So now you double the aperture, so that white will be 'overexposed' – f16 doubles to f11, not f8 or f32.

Now you have an 'ideal' set-up – film speed, shutter speed and aperture. You can fiddle with the film speed, the aperture and the shutter speed until you get a value that suits you. For example, doubling the film speed from 100ASA to

200ASA could allow you to halve the shutter speed (say from one to half a second), or halve the aperture (from f8 to f11), but not both. And it works backwards too – using a half-speed film would entail doubling the shutter speed or doubling the aperture. There are scales in the diagram to show you how to do this. In general, slower films can show more fine detail, with less 'grain'.

But all normal films can show much more detail than there is on the screen anyway, so there is no good reason for not using a fast type, say 200ASA. Smaller apertures are better, because it keeps more of the picture in focus. And you should aim to keep the shutter speed between a quarter and two seconds.

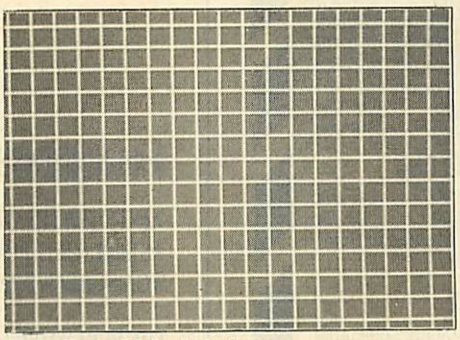
Typical values for my camera and monitor are f11 at one second for 200ASA film, but it will depend on your monitor. If you haven't got a camera that can measure the amount of light it needs, then use these typical values. Try a few pictures at the end of a roll of film, and adjust a bit next time if they aren't right.

Now set up your camera about a metre from the monitor, at the same height and pointing directly into the centre of the screen. This is vital to the photo; if you get the camera off-centre, the edges of the screen will look very curved in the picture. If you are lucky enough to possess one, a tripod is the best way to do this, remembering you have to keep the camera still for about a second – you certainly can't hold it by hand. But if your monitor is on a table, a small pile of books might be enough to keep the camera still and raise it to the right height. Some kind of rubbery mat under the camera will help too. Obviously, the computer screen should take up nearly all of the viewfinder, and you should focus the picture carefully.

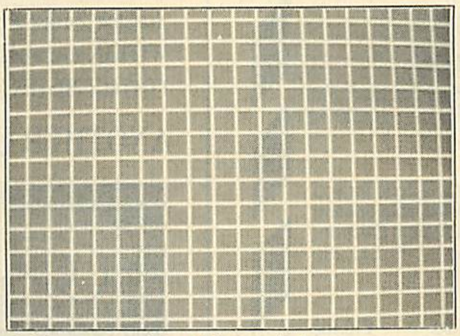
When you take the picture, make sure the room is dark, otherwise the other lights shining on the screen will reflect into the camera. Make sure you have the picture you want on the screen and in the viewfinder, and use a cable release to set off the shutter. This minimises the risk of the camera shaking. But again, if you don't have one, then a timer will work as well. Press it, and the delay will allow any movement of the camera to die away.

And to make sure you get the picture right, it might be wise to take three versions: one at your 'ideal' speed settings, one overexposed with a slower shutter speed or wider aperture, and one underexposed with a faster shutter or narrower aperture. It is best to double and halve the aperture or shutter speed for these 'bracketing' shots – tiny adjustments make no real difference to the final photo.

If you have a camera with interchangeable lenses, or you have a zoom lens, then you can make the final refinement yourself. Because monitor screens are curved, screenshots tend to have curved edges. Take a look. Put your face really close to a monitor – it looks very curved. Now look at it from further away, and the curvature is less noticeable. Using a long-focus 'telephoto'



Flat effect of telephoto lens



Bulging caused by wide-angle lens

lens helps to flatten out the curvature, and makes the edges of the final picture much straighter.

So a 135mm lens is better than the standard 50mm lens that most cameras of this sort come with. If you have a zoom lens, set it to its longest possible setting. It may mean you have to set the camera further away from the screen than you would with a normal lens – the distance to aim for is where the screen of the monitor fills almost all of the camera's viewfinder. The edges of the monitor should be visible around the edge of the frame.

Now you have all the advice you need to take good screen pictures – as good as any that appear in *Acorn User*. The long dark winter nights are an ideal opportunity to capture your best screen displays on film.

TOP TIPS

- Keeping the camera still is the most important thing. Getting it in focus won't mean a thing if the camera shakes
- Get the room as dark as possible – draw the curtains to take your photos
- Screen saving software like *Snatch* and *Replay* is invaluable for many programs – a still picture is vital
- Taking pictures of some commercial programs is difficult, particularly games, because of the animation. If you can, press the pause button
- Some games can't be paused – but sometimes the Break key can work. Press it and hold it down until you have taken the picture
- Avoid pure black backgrounds and white text – it tends to blur a bit. A blue background is easier to photograph
- If a black background is unavoidable, then turn the contrast knob on the monitor down a little to prevent any white text appearing blurred
- Once you have got a few pictures right, make a mark on your monitor where the contrast and brightness buttons are set, so you can always use the same settings
- A few people have auto-focus cameras. Some of these (in particular the Canon EOS) seem to work well focussing on a computer screen – it is worth trying if you have one of these cameras
- Colour slide film gives the best results for publication, but print film is easier for your own use. *Acorn User* usually uses Ektachrome 100
- Below is a table of 'ideal' film ASA values, shutter times and lens apertures. It shows, for example, that for 200ASA film, a one second exposure at f8 or two seconds at f11 are best. Make up a table like this for your own camera and monitor

Film	Shutter	Lens
100	1s	f5.6
100	2s	f8
200	1s	f8
200	2s	f11
400	1s	f11
400	2s	f16

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Peter Voke

Many games, including some adventures, make use of maps with at least an element of randomness in them. But you have to be careful in relying on random numbers, for they tend to produce rubbish – in a way that is what they are designed to do.

Three programs in this month's yellow pages set out to create maps and scenes with at least an element of randomness. The random number generator in the Basic interpreter inside the BBC does not produce completely random numbers. Instead it produces a sequence of numbers that are related in a complex way, too subtle to detect the connection. For this reason its proper title is 'pseudo-random number generator'. To see this, a very simple program is sufficient. Switch to Mode 0 (if you have a Master, make sure you aren't in a shadow mode) and try:

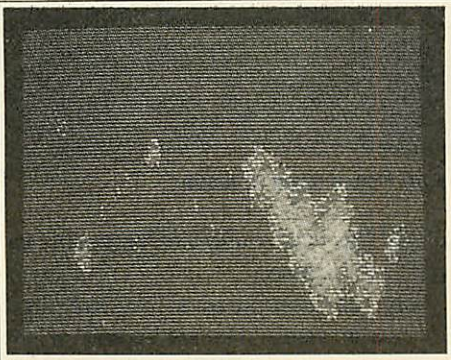
```
FOR I%=&3000 TO &8000:
?I%=RND(256):NEXT
```

This will produce something on the screen that does look remarkably random. Now try the following statement:

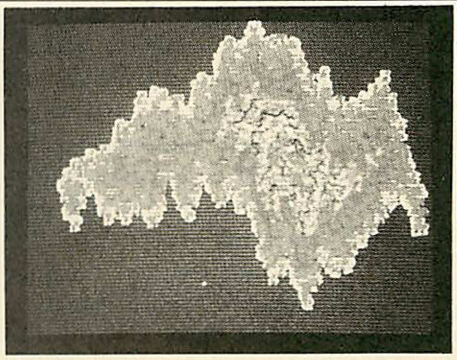
```
FOR I%=&3000 TO &8000:
A%=RND(-TIME):
?I%=RND(256):NEXT
```

You should see why the common habit of re-initialising the random number generator using the TIME has to be used carefully; the random number generator is not totally random. The 'seed' (the negative number in brackets) totally controls the sequence of numbers you will get.

Use the random number generator in the wrong way, and you either get something that is far too random or something that is not random enough. Listing 1 is a careful compromise between these two pitfalls. It draws maps of imaginary planets, based on random numbers. At the beginning, you are asked to give a seed number. This allows you some control, and if you remember the seed number of a particular map, you can reproduce it by giving the same seed number again. If you want a genuinely 'random' choice, enter 0 for the seed.



Random numbers produce an archipelago ...



... or a single island map

The maps are remarkably pretty, and look realistic mainly because the random element in them is tightly controlled. Nevertheless, you will not get precisely the same map with any two distinct seed numbers. On my computer (a BBC with Basic 2) seed numbers 11111 or 1717 will give what look like large volcanic islands with very realistic calderas. Seed 54321 gives one large continent, while 13 or 11 give smaller islands dotted about in an archipelago. Seeds 12 and 9875 give mountain chains, and many others, like 2468, give islands linked or divided by narrow straits.

You may already be wondering where you made a mistake typing the program. But if you are running on anything other than a BBC with issue 2 Basic, the results of running the map program will be different, since the random number generator works in a different way on a Master, Compact or Electron – to say nothing of the Archimedes. On these machines you will have to find the things described by trial and error.

These maps seem to conjure up possibilities for games of all sorts, with their bays, valleys, mountain ranges, rivers, lakes and peninsulas. The program is very short at less than 50 lines, and could be included as a procedure in another program, such as one running an adventure, without too much difficulty.

Once a map has finished, you press any alphabet key to continue to another map. Alternatively, try pressing the keys 0, 1, 2 or 3. These will cycle the four colours used in the mode 1 screen through all the possibilities: red, green, yellow, blue, magenta, cyan, white and black.

By setting up particular colours you can change your maps to get an eerie, alien feel, as if they were maps of waterless planets with unusual surface chemistries. By making the seas red, one gets a distinctly Martian feel, as if highlands are rising out of plains of red dust. Black 'seas' give the feeling of an airless moon, while cyan or green ones

perhaps conjure up visions of oceans of methane or ammonia.

This brings us to the next program, which was inspired by these alien maps and was designed to bring the strange planets and moons even more to life. Listing 2 is designed to produce views typical of various planets. As with the first program, you need to see these on a colour monitor or TV. Randomness is used extensively, though the basic layout of the scene is broadly the same in each case.

One important point if you are entering this program at the keyboard: the DATA statements are referred to by a calculated RESTORE. This is not a common feature of Basic programs, and it means that the precise line numbers must be reproduced for all the lines of DATA. They must start at the right line number and increment by 10 as you go. Be very careful before you renumber this program; you could wreck the relationship needed between the DATA and RESTORE statements.

Once you have the program running, you will be presented with a choice of which planet type to view. This is really just a fanciful way of choosing various colour combinations, though they do correspond to my personal idea of planets that are similar to Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune and Pluto, for choices 1 to 9 respectively.

The subtypes 1 to 4 choose certain particular colour combinations within the planet class, changing the colour of the sky, mountains, sun or ground. For the gas giant planets Jupiter, Saturn, Uranus and Neptune you will then find you are given a choice of moon type, since the view you will be shown is supposed to be from the surface of a moon, with the gas giant in the background.

In the data statements, some comments are included to indicate roughly what type of moon I had in mind in choosing the colours — though my chemistry is far from good enough to guarantee accuracy! Methane just sounds bluish to me: I don't know what colour seas of methane ought to be.

Having chosen planet and moon types, various options are available for the way the surface is depicted. The choice here is entirely up to you, though the 'sea' option gives a rather boringly flat view, with no mountains in the background; this is the main difference between 'sea' and 'flat' surfaces.



View from a moon of Jupiter

Try out the program as you like. Here are a few views that are typical of the best you get on a BBC running Basic 2: Seed 4455, Saturn subtype 1, moon 2, flat unbroken terrain; seed 13, Earth subtype 1, contoured unbroken terrain; seed 1, Pluto subtype 2, contoured broken terrain; seed 54321, Neptune subtype 4, moon 2 flat receding. If you have a Master, try seeds 6 or 123 instead.

One of the extraordinary things about programs based on the random number generator is the feeling that you have a program that can produce an (almost) infinite variety of outputs. The map program is really very short, and the views program not much longer. Yet the amount of information contained in the total number of maps or views in immense.

The secret lies with the random number generator, which effectively passes through a sequence of four-byte numbers in an apparently random order, giving the next number in sequence each time it is called. The order is not truly random, but the way the generator goes from one number to the next is sufficiently complex that you cannot see any connection. The total number of positive four-byte integers is 2147483650, and the random number generator goes through all of these before it starts to repeat itself. So that is how many different maps and scenes there are in the BBC micro: over two billion for each choice of colour and terrain. Not quite an infinite number of possible outputs, but near enough.

Listing 3 is a small adventure program based on random mazes. The way the mazes are produced is a little subtle, though. It is done by procedure PROCm, and if all you want is a procedure to create 16 by 16 mazes, you can extract PROCm and the procedures it uses for the purpose. The mazes have the property that each of the 256 locations is connected to every other by one and only one route.

If you have a Master 128, or any other type of computer with PAGE normally at &1100 or lower, you should have no problems getting the program running. If your machine does not have shadow memory, and PAGE is normally at &1900 or above, you are likely to run out of memory. Save the program, reset PAGE to &1100, and then CHAIN it; this allows enough room for the arrays.

The game is set up so that each maze is a 'level' in an infinitely tall castle. You can go up or down levels at the left-hand top or bottom corners of each maze (north-west or south-west), which are marked u or d as appropriate. You start at level 500 and can go down to level one or up indefinitely. This may be a short program, but it produces a very large maze! The maze is 'grown' from randomly selected seed positions as you watch it

being drawn; the arrow symbol put in at the end represents your initial position and orientation.

Once the maze for the level you are on has been drawn, press any key and you will find yourself in a standard three-dimensional maze game with coloured walls. Use any key to move forward one position. The number keys from 2 to 9 move forward from twice to nine times as far, if you're in a hurry. The left and right cursor keys make you turn left or right, while the up and down cursor keys are used when you reach the corners that connect with the level above or below.

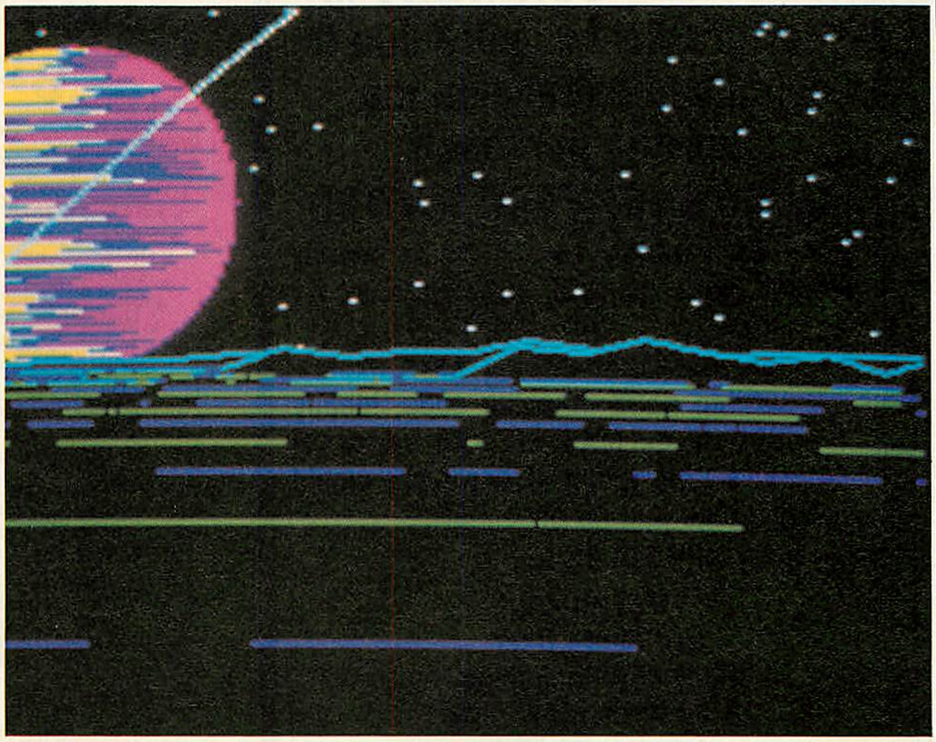
If you get lost, press the Q key to recall the map. The arrow indicates your position and orientation. At every point in the three-dimensional maze your compass direction is shown at the top, along with the score.

The object of the adventure, of course, is to get as high a score as possible. You have to look for treasure, such as chains, coins, daggers, jewels, pearls, crowns and gold. They score from one to seven points respectively. You have to be standing right on top of the treasure to see it – it appears on the screen, and the name of the treasure appears under the compass heading and score so you know what you have found: you pick up the treasure using the TAB key.

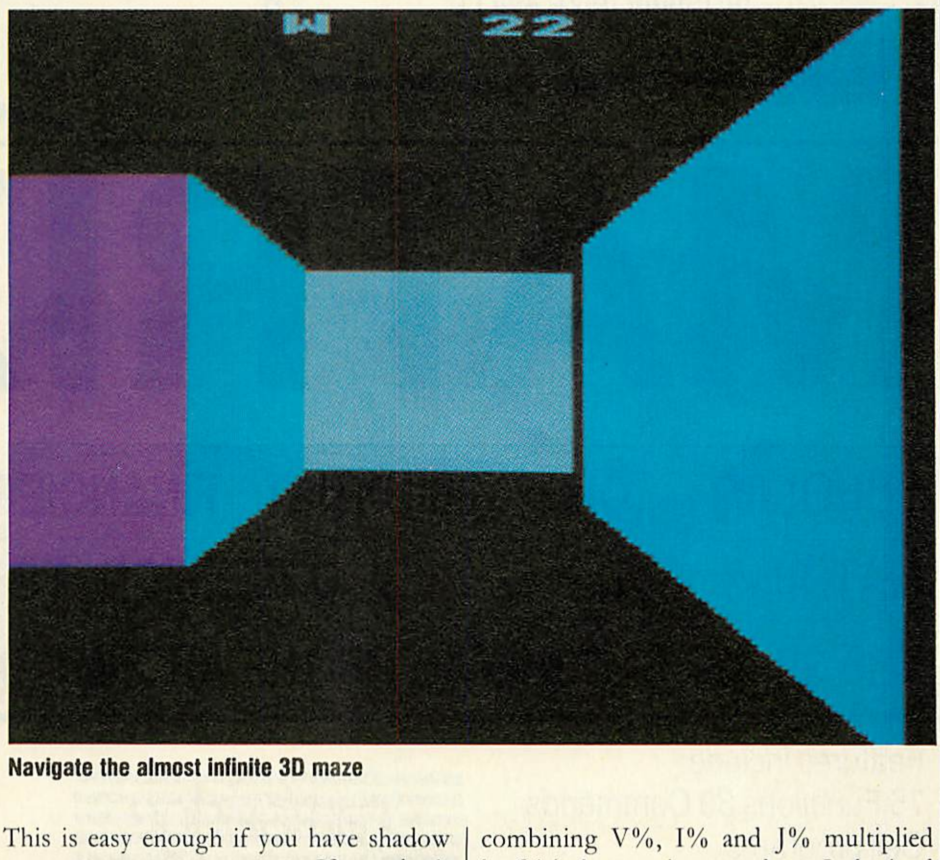
Each maze is actually stored in the form of a bit pattern in page &900 to &9FF. Since the computer clearly cannot store an infinite number of mazes (or even two billion odd), the maze for each level is regenerated as you move on to that level, overwriting the maze for the previous level. The random number generator is reset using the level number as a seed, so that on level 500 you always have the same arrangement of walls and passages, while other levels have their own different but consistent arrangements.

Again, the mazes produced by a Master are different from those on the BBC. They seem to be distinctly easier, though with fewer places to put treasure. The treasure is always right at the end of a dead-end passage, or in an alcove.

If you want to make the game more interesting, add more objects after line 1350. You will also need to increase the argument of the RND() function in line 1260 to the total number of different objects you now have, and change the ON R% GOSUB in the following line to point to your new object subroutines.



Saturn's rings seen edge-on



Navigate the almost infinite 3D maze

This is easy enough if you have shadow memory on your computer. If you don't watch out for the No Room error message – your program is too big.

Notice the odd way of combining V%, the level number, and I% and J%, which are your co-ordinates, in line 1240. I found that if I just used –V%–I%–J%, the random number generator produced the number 1 rather more often that I wanted it to. By combining V%, I% and J% multiplied by fairly large prime numbers, I obtained a seemingly much more random behaviour, yet still such that if gold was found in a particular place on a particular level once, it always would be there.

The overall effect is of a real castle, full of surprises yet predictable once you know where things are. In this adventure, you will run out of patience long before you run out of new passages to explore.

CHILDREN'S STORIES

Carefully controlled vocabulary and simple instructions now make adventure programs available to infants. Three examples are assessed in the context of the classroom

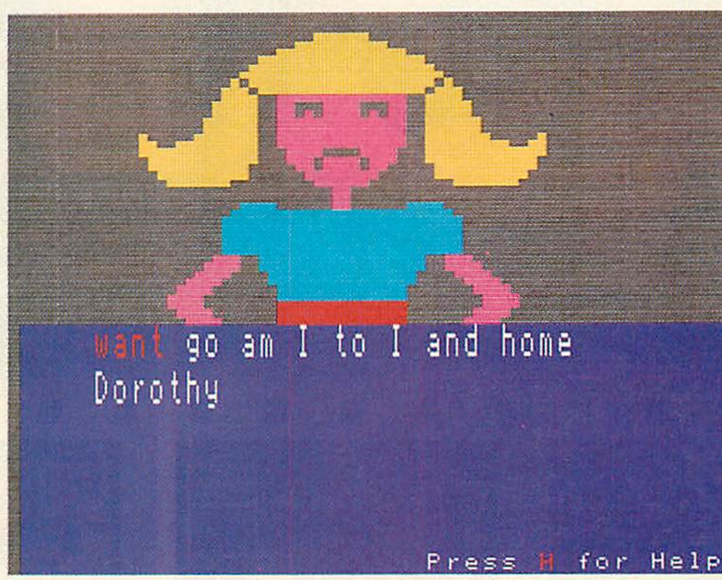
Chris Drage and Nick Evans

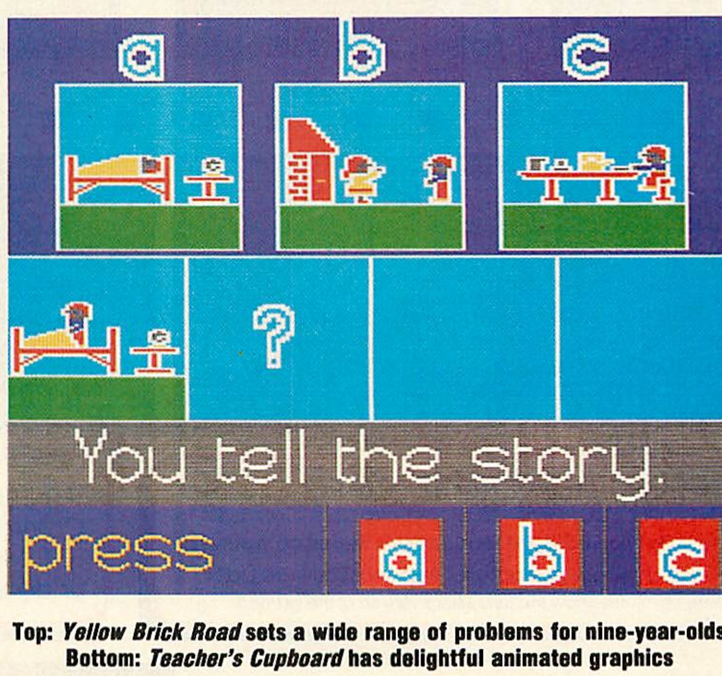
A good deal of language development in infant classrooms is fostered through fiction and fantasy, where unfamiliar emotions and situations can be safely encountered. Adventure programs provide another medium through which children can enter imaginary worlds. Typical of the quality language-based software available are *Pip goes to the Moon, Yellow Brick Road, Albert's House, Fairy Lands* and *Teacher's Cupboard.*

Using adventure programs with infants may appear limited by vocabulary and the level of keyboard skills, but each of the programs discussed here uses carefully-controlled vocabulary and well defined procedures to overcome the reading problem. The exploration of a two-storey home in Albert's house is also described in simple words leading to a visualisation and creation of three–dimensional plans.

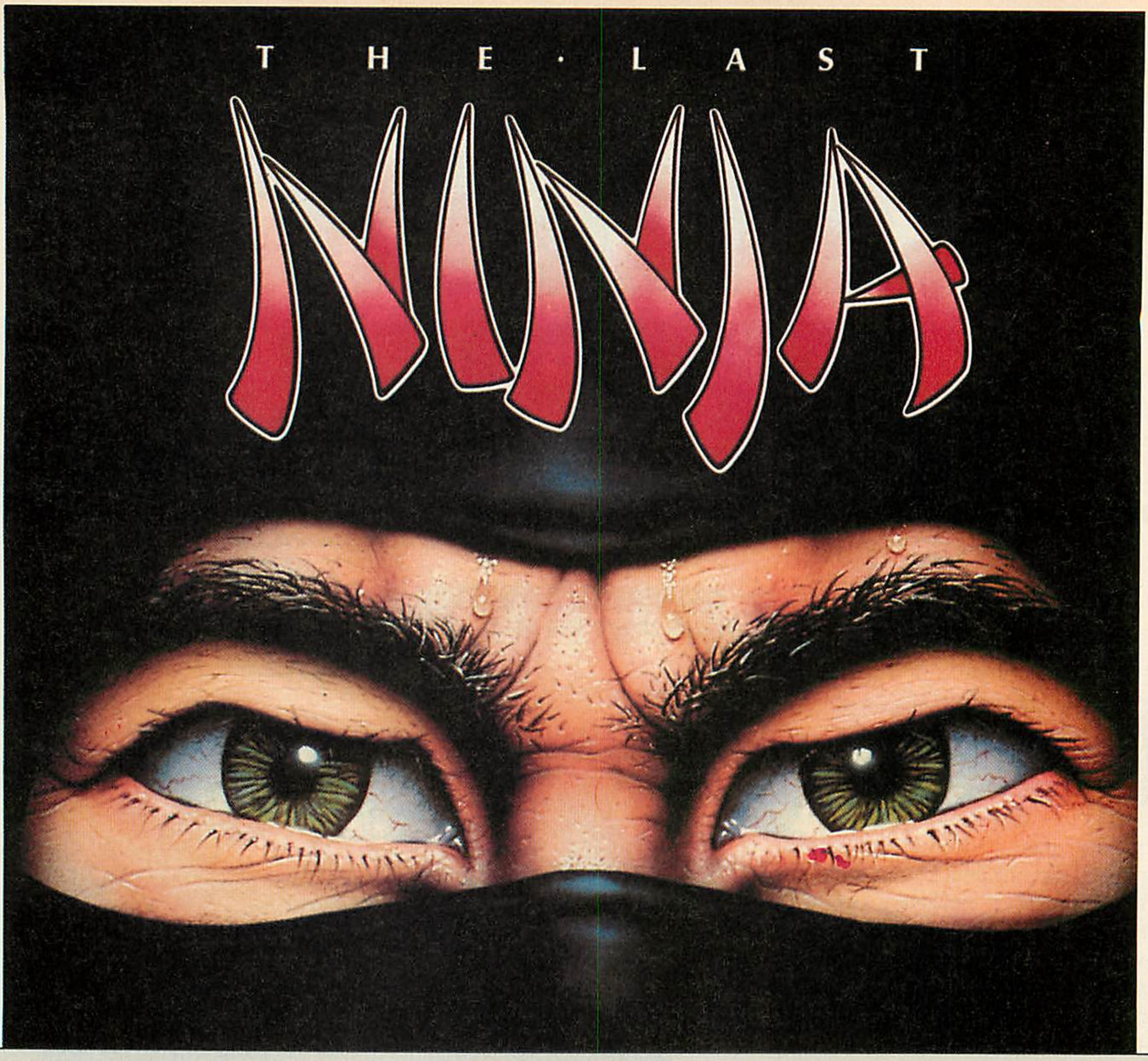
Adventure programs usually cannot be used by four to six-year-olds, but *Pip goes to the Moon* is an exception. It was developed by a team of teachers, with support materials such as vocabulary and picture sheets. Unlike most educational adventures, *Pip* is designed for individuals rather than groups — probably a sound strategy considering the egocentric nature of the age group. However, it would be nice to have the opportunity for teacher-led group work. After a child has worked through the adventure he or she can produce their own adventure book on a printer (the print styles are delightful).

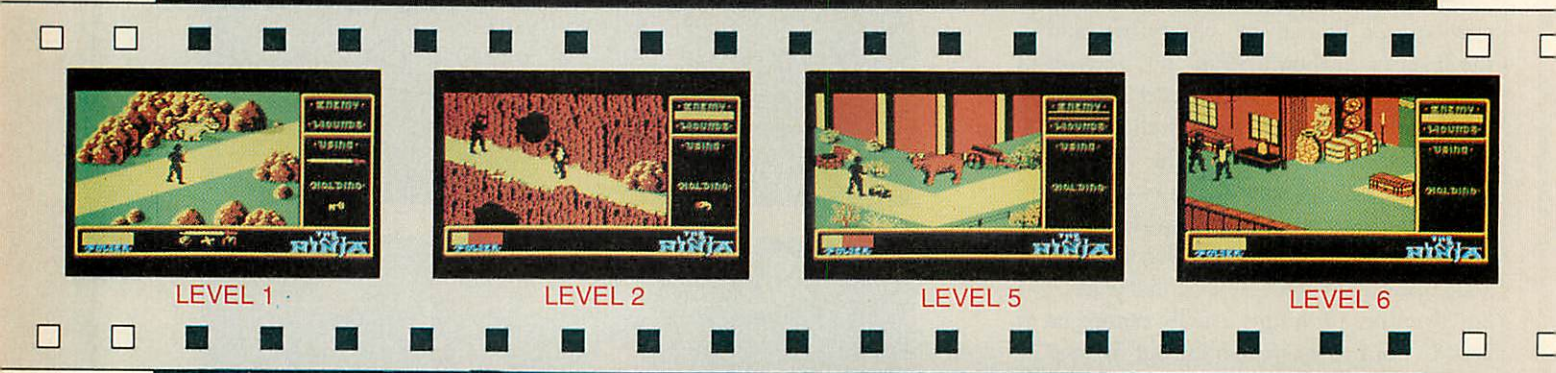
Obviously children will require a number of skills and concepts before embarking on *Pip;* numbers 1-9, being able to add up to five, spell their own





Top: *Yellow Brick Road* sets a wide range of problems for nine-year-olds
Bottom: *Teacher's Cupboard* has delightful animated graphics





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name, recognise the initial letter of three words and match shapes, colours and words. Throughout *Pip* options are highlighted in sequence and are selected with the space bar: a sensible feature. Children can make a number of choices, and there are at least two sections of the adventure which the computer randomises, so no two sessions will be the same. *Pip Goes to the Moon* is a very pleasing introduction to adventures, and a sequel, *Pip's Island Adventure*, should be out by the time you read this.

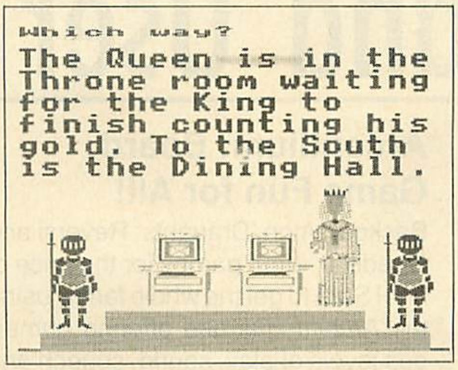
Aimed at the other end of the infant school is *Yellow Brick Road* for seven to nine-year-olds, also developed by the NORICC team. This could be used with top infants who are familiar with the plot of *The Wizard of Oz*. The activities generated are designed to develop language skills through problem solving, decision making and prediction. The charming graphics are like those in *Granny's Garden* and children love them.

The program has three parts, each of which may be selected from a menu. Children must help Dorothy locate her travelling partners, then travel together along the Yellow Brick Road and finally help the characters to reach their goals. In each part a variety of problems must be solved: code breaking, colour mixing, word building, number patterns, sentence ordering and synonyms to mention a few! Solutions are in the handbook.

Albert's House fits comfortably into the infant school's language/arts curriculum. It comprises a suite of four programs designed to enrich and complement the topic 'my house': a popular theme with this age group. Albert Mouse lives in a detached suburban house with a cat. The programs stimulate considerable discussion at the computer and a lot of work away from it. 'Explore the House' contains no text and offers children an uncomplicated tour of Albert's environment. Nine locations are linked and presented on screen. Children 'move' from room to room becoming familiar with the geography of the house.

'Search the House' extends the first program by introducing text and by concentrating on relevant detail within each location. By interrogating the computer in much the same way as a simple database, children gain information about every nook and cranny, including Albert's mouse-hole!

In 'Hide and Squeak' Albert invites the children to hide him somewhere in



Fairy Lands **adventure-writing for top infants**

the house, and then search for him with the help of a 'mouse-meter'. A number of control options are offered to help the teacher tailor the program to individual needs of the children.

'Save the Mouse' is a problem-solving task requiring logic and strategy. A pack of sheets of words and pictures which can be photocopied provides a range of preliminary and follow-up activities.

Albert's House is popular with six to seven-year-olds, and teachers will find it can enhance a number of related topics.

Teacher's Cupboard from Sherston offers adventure and problem-solving activities for five to seven-year-olds. It comprises two delightful adventures for lower and middle infants respectively. The package contains a disc, workcards, story book, poster, function key strip, Concept Keyboard overlays and teacher's handbook.

The sound level and choice of input device may be selected. Interestingly, Sherston will provide a Microvitec Touchtec 501 version on request. This means a child simply points to the screen to select an object. The first adventure is 'The Apple'. Here, lower infants are invited into the world of the teacher's book room and then are transported to land of magic where two visual puzzles must be solved: sequencing and 'I Spy'. Similarly, 'The Crown' (for middle infants), uses the same scenario and two puzzles — cloze procedure and 'Spot the Difference' — to locate a crown and return it to the teacher's bookroom.

The animated graphics are delightful, as is usual from Sherston, and the user-interface is well thought out. The screen text is a little 'blocky' but acceptable for young children. *Teacher's Cupboard* is a valuable resource which could form a central theme for a topic or be used to complement one.

Not strictly an adventure as such, but rather a simple adventure land generator, *Fairy Lands* from Resource is for top infants who are able to produce simple branching stories with a definite 'adventure flavour'; however, puzzles and problems cannot be included. The program further allows children to explore made-up 'adventures' saved on disc. It provides children with a taste of adventure writing which could be developed further, and even young children can combine pictures from a disc library with text and special character blocks to create scenes.

Fairy Lands permits children to map their adventure on a 10 x 20 grid, numbering each location as they go. Pages are created and edited as they are in another Resource pack, *Fairy Tales*, with up to 11 pictures per scene, but 26 special picture characters allow complicated scenes to be created. Large, colourful text completes each scene. Up to 40 scenes can be compiled into an 'adventure' and printed out individually. When exploring an adventure, movement from scene to scene is achieved by entering 'N, S, E or W' whenever a scene is displayed. Although only accessible to children with well developed language and keyboard skills, *Fairy Lands* offers a pleasing introduction to adventure writing.

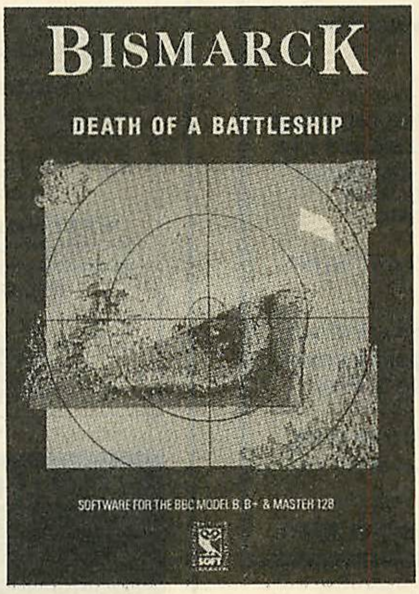
Fairy Lands excepted, what each program discussed has in common is stimulating and motivating subject matter, colourful graphics, well structured vocabulary and simple input routines. Each provides the infant teacher with highly motivating resource materials from which a number of related themes may develop. Each program has proven particularly successfully with infant children; positively encouraging children to talk and listen to each other in the quest for solutions. Each is certainly guaranteed to stimulate a wealth of discussion and written work.

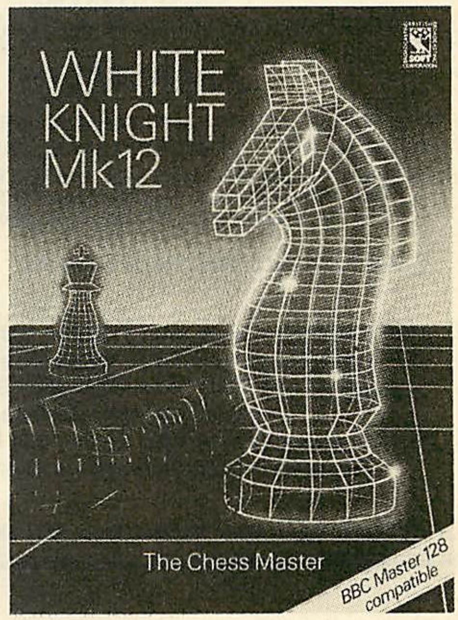
Pip Goes to the Moon *£9 for the BBC B, B+ and Master, £11 for the Compact and* Yellow Brick Road *£12 for the BBC B, B+ and Master, £14 for the Compact from Northern Micromedia, Resources Centre, Coachline Campus, Newcastle-Upon-Tyne, NE7 7XA.* Albert's House, *£16.95 plus VAT and* Fairy Tales, *£14.95 plus VAT, both for BBC B, B+, Master 128 and Compact from Resource, Exeter Road, off Coventry Grove, Doncaster DN2 4PY.* Teacher's Cupboard, *£20.13 for the BBC B, B+, Master 128 and Compact from Sherston Software, Swan Barton, Sherston, Malmesbury, Wilts SN16 OLH.*

OFFERS

BBC GAMES







Play while you learn

The three BBC games on offer this month are all a little bit more than games, they are great fun to play while being excellent teaching aids. So pick up one or all of these games and learn to play battleships, bridge or chess this New Year.

Re-enact the most memorable naval battle of the second world war with *Bismarck,* the enthralling strategy game based on the Royal Navy's frantic search for the predatory German battleship Bismarck in the spring of 1941. Pit your wits against the computer or take either the British or German role against the other player. You could try an exciting alternative battle plan and remake history! Everytime you play, the User Guide also gives you all the historical background to the battle. *Bismarck* is available for the BBC B, B+, Master128 at only £14.95.

Black Queen is an absorbing Contract Bridge program, a must for complete beginners or experienced players alike. In addition to features such as bidding, playing, and scoring, you can construct deals from standard or 'Classic' ones in books or newspapers, and experiment with 'tailor-made' deals. *'Black Queen'* offers you an almost inexhaustible source of bridge enjoyment and comes on disc for the BBC B, B+ and Master128 at £14.95.

White Knight Mk 12 is a game with the features offered by a sophisticated and powerful chess program. These include a 'thinking moves ahead' display and a facility to step forwards or backwards through 120 moves. You can also change sides with the program or try out the frantic pace of playing 'blindfold' chess! *White Knight* also features pawn promotion and elapsed time clock for white and black. The game is an advanced update of *White Knight Mk 11* and is on disc for the BBC B, B+, Master 128 and Master Compact at £14.95.

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Have you the Skill and Cunning to Conquer the World of EXILE?

A Massive Arcade Adventure featuring Characters with Realistic Movements and Actions.

The planet Phoebus has been taken over by an exiled, evil Genetic Engineer, named Triax. In a complex warren of caves, he has built an evil world inhabited by eccentric robots and strange mutated creatures, such as blue monkeys, giant wasps and sharp-toothed eyeless maggots. On the planet surface and around the caves are scattered the debris of a previous mission, and maybe some of the members of that ill-fated venture still remain.

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Each copy of EXILE includes:

- The Exile game programs, including an enhanced version which will run on the BBC Master series and BBC Micros with sideways RAM.
- A Novella, which sets the scene for the Exile game.
- An Instruction Manual.

The game was designed and written by Peter Irvin and Jeremy Smith.

BBC Micro Cassette	**£12.95**	Acorn Electron Cassette	**£12.95**
BBC Micro 5¼" Disc	**£14.95**	BBC Master Compact 3½" Disc	**£19.95**

(Compatible with the BBC B, B+ and Master Series computers)

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(The screen pictures show the enhanced version of the games.)

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YELLOW PAGES

COMPATIBILITY

Program	Page	BBC B	B+/128	Master 128	Master Compact	Electron	Arc	6502SP/ Turbo	ADFS	Econet	Shadow RAM	Monthly T/D
Hints & Tips												
Listing 1	97	■	■	■	■				■	■	■	■
Listing 2	98	■	■	■	■	■		■	■	■	■	■
Listings 3-4(1)	98	■	■	■	■			■	■	■	■	■
Listings 5(2)	98	■	■	■	■			■	■	■	■	■
Arc Agora												
Listings 1-4	99						■		■	■	■	■
Listing 5	101						■		■		■	■
Listing 6	102						■		■	■	■	■
Joe's User Card		■(3)	■	■	■		■	■	■	■	■	■
Listings 1-2	103						■		■	■	■	■
GKS												
Listings 1-2(4)	—						■		■	■	■	■
Random Numbers												
Listings 1-3	110	■	■	■	■	■	■	■	■	■	■	■

Note 1. Requires Interword. 2. Requires Wordwise Plus. 3. Requires Shadow RAM. 4. On monthly disc only; paper listing available with SAE.

HINTS & TIPS

See Hints & Tips, page 41

Listing 1 Auto-screen off

```
   10 REM Fade to Black
   20 REM by David Ather
ton
   30 REM for B/B+/M/C
   40 REM (c) Acorn User
 Jan 89
   50 :
   60 seconds=5
   70 delay=(50*seconds)
+256
   80 oldkeyv=!&228
   90 FOR pass=0 TO 3 ST
EP 3
  100 P%=&900
  110 [OPT pass
  120 .install
  130 SEI
  140 LDA #event MOD 256
  150 STA &220
  160 LDA #event DIV 256
  170 STA &221
  180 LDA #keytest MOD 2
56
  190 STA &228
  200 LDA #keytest DIV 2
56
  210 STA &229
  220 CLI
  230 LDA #14
  240 LDX #4
  250 JMP &FFF4
  260 :
  270 .event
  280 PHP
  290 PHA
  300 TXA
  310 PHA
  320 TYA
  330 PHA
  340 JSR main
  350 PLA
  360 TAY
  370 PLA
  380 TAX
  390 PLA
  400 PLP
  410 .ret
  420 RTS
  430 :
  440 .main
  450 LDA &248
  460 AND #2
  470 STA teletext
  480 LDA off
  490 BNE ret
  500 DEC count
  510 BNE ret
  520 DEC count+1
  530 .nohi
  540 BNE ret
  550 LDY teletext
  560 LDA data+1,Y
  570 JSR program
  580 DEC off
  590 RTS
  600 :
  610 .keytest
  620 PHP
  630 PHA
  640 TXA
  650 PHA
  660 TYA
  670 PHA
  680 JSR main2
  690 PLA
  700 TAY
  710 PLA
  720 TAX
  730 PLA
  740 PLP
  750 JMP oldkeyv
  760 :
  770 .main2
  780 LDA #delay MOD 256
  790 STA count
  800 LDA #delay DIV 256
  810 STA count+1
  820 LDA off
  830 BEQ ret2
  840 LDY teletext
  850 LDA data,Y
  860 JSR program
  870 LDA #0
  880 STA off
  890 .ret2
  900 RTS
  910 :
  920 .program
  930 LDX #8
  940 STX &FE00
  950 STA &FE01
  960 RTS
  970 .data
  980 OPT FNequb(&01)
  990 OPT FNequb(&F0)
 1000 OPT FNequb(&93)
 1010 OPT FNequb(&FF)
 1020 .off
 1030 OPT FNequb(0)
 1040 .teletext
 1050 OPT FNequb(0)
 1060 .count
 1070 OPT FNequw(delay)
 1080 .end
```

Continued ▶

◀ Listing 1. Auto-screen off continued

```
 1090 ]
 1100 NEXT pass
 1110 A$="SAVE BLACK "+S
TR$~install+"+"+STR$~(en
d-install)
 1120 PRINT A$
 1130 PRINT "Press S to
save, or I to install"
 1140 REPEAT G%=GET AND
&DF:UNTIL G%=ASC"S" OR G
%=ASC"I"
 1150 IF G%=ASC "I" THEN
 1190
 1160 PRINT A$
 1170 PROCoscli(A$)
 1180 PRINT "Type *BLACK
to install":END
 1190 PRINT "Fader insta
lled. Active when unatte
nded for ";seconds;" sec
onds"
 1200 END
 1210 :
 1220 DEF FNequb(b%)
 1230 ?P%=b%
 1240 P%=P%+1
 1250 =pass
 1260 :
 1270 DEF FNequw(b%)
 1280 ?P%=b% MOD 256
 1290 P%?1=b% DIV 256
 1300 P%=P%+2
 1310 =pass
 1320 :
 1330 DEF PROCoscli(stri
ng$)
 1340 DIM X% &FF
 1350 Y%=X% DIV 256
 1360 $X%=string$
 1370 CALL &FFF7
 1380 ENDPROC
```

Listing 2. Label lister

```
   10*K.OM%=PA.:L%=0:REP
.M%=M%+L%:N%=M%?1*256+M%
?2:L%=M%?3:J%=3:REP.J%=J
%+1:U.M%?J%<>32:IFM%?J%<
>46U.M%+2=TOP EL.P.RI."
   "+STR$N%+" .",7);:REP
.J%=J%+1:V.M%?J%:U.M%?J%
=32OR M%?J%=13:P.:U.FA.!
M
```

Listing 3. Wordwrap on

```
   10 REM Inter-Word wor
dwrap on
   20 REM by James Hunt
   30 REM for BBC B/B+/M
/C
   40 REM (c) Acorn User
 Jan 89
   50 :
   60 indir=&70
   70 FOR pass=0 TO 3 ST
EP 3
   80 P%=&900
   90 [OPT pass
  100 LDA #0
  110 STA indir
  120 LDA &29
  130 STA indir+1
  140 LDY #&48
  150 LDA (indir),Y
  160 AND #&FE
  170 STA (indir),Y
  180 RTS
  190 :
  200 ]
  210 NEXT
  220 A$="SAVE WRAPON 90
0 "+STR$~P%
  230 PRINT "Press any k
ey to save"
  240 IF GET
  250 PRINT A$
  260 PROCoscli(A$)
  270 END
  280 :
  290 DEFPROCoscli($&700
)
  300 LOCAL X%,Y%
  310 Y%=7
  320 CALL &FFF7
  330 ENDPROC
```

Listing 4. Wordwrap off

```
   10 REM Inter-Word Wor
dwrap off
   20 REM by James Hunt
   30 REM for BBC B/B+/M
/C
   40 REM (c) Acorn User
 Jan 89
   50 :
   60 indir=&70
   70 FOR pass=0 TO 3 ST
EP 3
   80 P%=&900
   90 [OPT pass
  100 :
  110 LDA #0
  120 STA indir
  130 LDA &29
  140 STA indir+1
  150 LDY #&48
  160 LDA (indir),Y
  170 AND #&FE
  180 EOR #1
  190 STA (indir),Y
  200 RTS
  210 :
  220 ]
  230 NEXT
  240 A$="SAVE WRAPOFF 9
00 "+STR$~P%
  250 PRINT "Press a key
 to save"
  260 IF GET
  270 PRINT A$
  280 PROCoscli(A$)
  290 END
  300 :
  310 DEFPROCoscli($&700
)
  320 LOCAL X%,Y%
  330 Y%=7
  340 CALL &FFF7
```

Listing 5. File backup

```
    REM Grandfather-Father-Son
    REM by Julia M.E.Gwyther
    REM for B/B+/M/C with Wordwise Plus
    REM (c) Acorn User Jan 89
    CLS
    PRINT "     Save latest text as SON"
    PRINT "     ___________________________"
    PRINT
    PRINT "Drive 0  Directory R will be u
sed"
    PRINT
    PRINT "Do you want to proceed?"
    PRINT "Type Y or N"
    G$=GCK$
    IF G$<>"Y" AND G$<>"y" THEN PROCnosav
e
    REM rename and save
    PRINT
    PRINT "           Save routine"
    PRINT "           ______________"
    PRINT
    PRINT "Deleting GRANDAD"
    *DELETE :0.R.GRANDAD
    PRINT "Renaming DAD as GRANDAD"
    *RENAME :0.R.DAD R.GRANDAD
    PRINT "Renaming SON as DAD"
    *RENAME :0.R.SON R.DAD
    PRINT "Saving text as SON"
    SELECT TEXT
    SAVE TEXT ":0.R.SON"
    PRINT
    PRINT "             Now saved"
    PRINT "             __________"
```

Continued ▶

◀ Listing 5. Wordwise file backup continued

```
PRINT
VDU7
PROCend
.nosave
PRINT
PRINT "              Not saved"
PRINT
.end
PRINT "Press any key"
G%=GET
DISPLAY
END
```

See Arc Agora page 47

Listing 1. Create sample

```
 10 REM Agora - listing 1
 20 REM Creates a sound sample
 30 REM by Dave Acton
 40 REM for Archimedes only
 50 REM (c) Acorn User January 1989
 60 :
 70 MODE 0
 80 PRINT "Creating sample sound file.
..."
 90 DIM d(255),lump% 255
100 FOR s%=0 TO 255
110 d(s%)=&7F*SINRAD(s%*360/256)
120 NEXT
130 CLOSE# 0
140 out%=OPENOUT "Raw"
150 FOR batch%=1 TO 500
160 PRINT TAB(0,1)batch%
170 FOR s%=0 TO 255
180 d(s%)=d(s%)*0.99
190 lump%?s%=&80+d(s%)
200 NEXT
210 SYS "OS_GBPB",2,out%,lump%,256
220 NEXT
230 CLOSE# out%
240 PRINT "Sample file saved as 'Raw'"
250 END
```

Listing 2. Strip sample

```
 10 REM Agora - listing 2
 20 REM Modifies sample data
 30 REM by Dave Acton
 40 REM for Archimedes only
 50 REM (c) Acorn User January 1989
 60 :
 70 MODE 0
 80 DIM c%(255)
 90 FOR x%=0 TO 255
100 SYS "Sound_SoundLog",(x%-&80)<<24
TO c%(x%)
110 NEXT
120 INPUT "Which 'raw' file? "f$
130 IF f$="" f$="Raw"
140 in%=OPENIN(f$)
150 e%=EXT# in%
160 CLOSE# in%
170 DIM junk% e%
180 SYS "OS_File",255,f$,junk%
190 PRINT "Strip off data at start? (Y
/N) ";
200 REPEAT
210 yn%=INSTR(" YyNn",GET$) DIV 2
220 UNTIL yn%>0
230 IF yn%=1 PRINT "YES":first%=&18 EL
SE PRINT "NO":first%=0
240 PRINT "Modifying data now..."
250 FOR x%=first% TO e%
260 x%?junk%=c%(x%?junk%)
270 NEXT
280 INPUT "Save converted data as: "f$
290 IF f$="" f$="Demo"
300 SYS "OS_File",0,f$,,,junk%+first%,
junk%+e%
310 PRINT "Modified data saved as '"f$
"'"
320 END
```

Listing 3. Convert sample to module

```
 10 REM Agora - listing 3
 20 REM Makes a sound module
 30 REM by Dave Acton
 40 REM for Archimedes only
 50 REM (c) Acorn User January 1989
 60 :
 70 MODE 0
 80 INPUT "Enter name of (modified) da
ta file: "f$
 90 IF f$="" f$="Demo"
100 SYS "OS_File",5,f$ TO ,,,,size%
110 t$=LEFT$(f$+STRING$(10," "),10)
120 DIM code% &1000+size%
130 value=0:amp=1:phaseacc=2
140 time=4:read=5:ptr=9
150 dmaend=10:dmastep=11:dmastart=12
160 sp=13:link=14:pc=15
170 FOR pass%=4 TO 6 STEP 2
180 P%=0:O%=code%
190 [OPT pass%
200 EQUD 0
210 EQUD initmod
220 EQUD finalmod
230 EQUD 0
240 EQUD title
250 EQUD help
260 EQUD 0
270 EQUD 0
280 EQUD 0
290 EQUD 0
300 :
310 .title
320 EQUS "AU-"+f$
330 EQUB 0
340 ALIGN
350 .help
360 EQUS "AU-"+t$+CHR$9+"1.00 ("+MID$(
TIME$,5,11)+")"
370 EQUB 0
380 ALIGN
```

Continued ▶

◀ Listing 3. Convert sample to module continued

```
390 :
400 .initmod
410 STMFD (sp)!,{link}
420 ADR R0,voicebase
430 MOV R1,#0
440 SWI "Sound_InstallVoice"
450 STR R1,slot
460 ADR R0,v%
470 LDR R1,howbig
480 ADD R0,R0,R1
490 STR R0,end
500 LDMFD (sp)!,{pc}
510 :
520 .finalmod
530 STMFD (sp)!,{link}
540 LDR R1,slot
550 SWI "Sound_RemoveVoice"
560 LDMFD (sp)!,{pc}
570 :
580 .voicebase
590 B fill
600 B fill
610 B gateon
620 B gateoff
630 B instance
640 LDMFD (sp)!,{pc}
650 LDMFD (sp)!,{pc}
660 EQUD voicename-voicebase
670 :
680 .voicename
690 EQUS "AU-"+f$
700 EQUB 0
710 ALIGN
720 :
730 .instance
740 STMFD (sp)!,{R0-R4}
750 MOV R0,#0
760 MOV R1,#0
770 MOV R2,#0
780 MOV R3,#0
790 MOV R4,#0
800 SWI "Sound_Configure"
810 LDR R0,[R3,#12]
820 STR R0,logampptr
830 LDMFD (sp)!,{R0-R4,pc}
840 :
850 .gateon
860 ADR value,v%
870 STR value,[ptr,#16]
880 LDR value,logampptr
890 STR value,[ptr,#20]
900 .fill
910 LDMIA R9,{R1-R6}
920 AND amp,amp,#&7F
930 LDRB amp,[R6,amp,LSL #1]
940 MOV amp,amp,LSR #1
950 RSB amp,amp,#127
960 .fillloop
970 LDR value,end
980 CMP read,value
990 ADRGE read,v%
1000 ADD phaseacc,phaseacc,phaseacc,LSL
#16
1010 LDRB value,[read,phaseacc,LSR #24]
1020 SUBS value,value,amp,LSL #1
1030 MOVMI value,#0
1040 STRB value,[dmastart],dmastep
1050 ADD phaseacc,phaseacc,phaseacc,LSL
#16
1060 LDRB value,[read,phaseacc,LSR #24]
1070 SUBS value,value,amp,LSL #1
1080 MOVMI value,#0
1090 STRB value,[dmastart],dmastep
1100 ADD phaseacc,phaseacc,phaseacc,LSL
#16
1110 LDRB value,[read,phaseacc,LSR #24]
1120 SUBS value,value,amp,LSL #1
1130 MOVMI value,#0
1140 STRB value,[dmastart],dmastep
1150 ADD phaseacc,phaseacc,phaseacc,LSL
#16
1160 LDRB value,[read,phaseacc,LSR #24]
!
1170 SUBS value,value,amp,LSL #1
1180 MOVMI value,#0
1190 STRB value,[dmastart],dmastep
1200 BIC phaseacc,phaseacc,#&FF000000
1210 CMP dmastart,dmaend
1220 BLT fillloop
1230 SUBS time,time,#1
1240 STMIB R9,{R2-R5}
1250 MOVPL R0,#%00001000
1260 MOVMI R0,#%00000010
1270 LDMFD (sp)!,{pc}
1280 :
1290 .gateoff
1300 MOV value,#0
1310 .flush
1320 STRB value,[dmastart],dmastep
1330 STRB value,[dmastart],dmastep
1340 STRB value,[dmastart],dmastep
1350 STRB value,[dmastart],dmastep
1360 CMP dmastart,dmaend
1370 BLT flush
1380 MOV R0,#%00000001
1390 LDMFD (sp)!,{pc}
1400 :
1410 .slot
1420 EQUD 0
1430 .logampptr
1440 EQUD 0
1450 .howbig
1460 EQUD size%
1470 .end
1480 EQUD 0
1490 ]
1500 v%=P%
1510 NEXT pass%
1520 PRINT "Importing data..."
1530 SYS "OS_File",255,f$,v%-P%+O%
1540 mod$="AU-"+LEFT$(f$,7)
1550 SYS "OS_File",0,mod$,,,code%,O%+si
ze%
1560 SYS "OS_File",&12,mod$,&FFA
1570 PRINT "Module saved as "mod$
1580 END
```

The length of the GKS library listings (70 kilobytes), plus the demonstration programs means they cannot be printed on the yellow pages. They can of course be obtained from the 3.5-inch monthly disc, or, by sending an SAE (marked 'GKS-Jan89') to AU, 20-26 Brunswick Place, London, N1 6DJ. They are not on the 5.25-inch monthly disc as the programs work only on an Achimedes.

Due to Micronet's abandonment of paid-for downloadable software, the listings will not be available on Micronet as they have been in the past.

Listing 4. Play sample

```
10 REM Agora - listing 4
20 REM Sound demonstration
30 REM by Dave Acton
40 REM for Archimedes only
50 REM (c) Acorn User January 1989
60 :
70 MODE 0
80 VOICES 1
90 DIM data% &100,i$(255)
100 REPEAT
110 CLS
120 PRINT "Instruments available:"'
130 val%=0
140 n%=0
150 SYS "OS_GBPB",8,,data%,1,n% TO ,,,
unread%,n%
160 WHILE NOT (unread%>0)
170 data%?(?data%+1)=13
180 f$=$(data%+1)
190 IF LEFT$(f$,3)="AU-" i$(val%)=f$:v
al%+=1
200 SYS "OS_GBPB",8,,data%,1,n% TO ,,,
unread%,n%
210 ENDWHILE
220 IF val%=0 PRINT"NONE":END
230 FOR i%=0 TO val%-1
240 PRINT i%+1;"...";i$(i%)
250 NEXT
260 PRINT
270 IF val%=1 THEN
280 f$=i$(0)
290 ELSE
300 REPEAT
310 PRINT "Which instrument? (1-";val%
;") ";
320 INPUT ""n%
330 UNTIL n%>=1 AND n%<=val%
340 f$=i$(n%-1)
350 ENDIF
360 OSCLI("RMLOAD "+f$)
370 OSCLI("CHANNELVOICE 1 "+f$)
380 RESTORE
390 REPEAT
400 READ p%,d%
410 IF p%>=0 THEN
420  SOUND 1,-12,p%-48,d%*1.5
430 ENDIF
440 TIME=0
450 REPEAT UNTIL TIME>=d%*7.5
460 UNTIL p%<0
470 OSCLI("RMKILL "+f$)
480 UNTIL FALSE
490 END
500 :
510 DATA 117,2,117,2,117,4
520 DATA 117,2,117,2,117,4
530 DATA 117,2,129,2,101,3,109,1
540 DATA 117,8
550 DATA 121,2,121,2,121,3,121,1
560 DATA 121,2,117,2,117,2,117,2
570 DATA 129,2,129,2,121,2,109,2
580 DATA 101,6,69,2
590 DATA 53,6,69,2,53,6,69,2
600 DATA 53,2,69,2,53,2,69,2
610 DATA 53,8
620 DATA -1,-1
```

Listing 5. Disc copier

```
10 REM Agora - listing 5
20 REM Disc sector copier
30 REM by Jason O'Broin
40 REM for Archimedes only
50 REM (c) Acorn User January 1988
60 :
70 MODE 0
80 memory=HIMEM-TOP
90 memory=memory-&8000
100 maxmem=memory
110 notracks=(memory DIV &1400)
120 DIM badsec 2560
130 DIM buffer maxmem
140 bytessec=1024
150 secno=5
160 noheads=2
170 PROCassemble
180 PROCgetinfo
190 PROCcopy
200 CLS
210 END
220 :
230 DEF PROCgetinfo
240 CLS
250 PRINT TAB(23,1)"Disc Sector Copier
 - by Jason O'Broin"
260 INPUT TAB(0,4)"Copy Large (640K) o
r Double sized discs (800K) (L/D): "size
$
270 PROCblank(4)
280 IF INSTR("LlDd",size$)=0 THEN size
$="D"
290 PRINT TAB(50,7);"Copying ";
300 IF INSTR("Ll",size$) THEN
310 PRINT "640K";
320 PROCchange640
330 ELSE PRINT "800K";
340 PROCchange800
350 ENDIF
360 PRINT " disc"
370 INPUT TAB(0,4)"Source drive: "sour
ce%
380 INPUT TAB(0,4)"Destination drive:
"dest%
390 PRINT TAB(0,4)"Insert SOURCE disc
in drive ";source%;" and press a key"
400 *FX 15
410 REPEAT UNTIL GET
420 PROCblank(4)
430 ENDPROC
440 :
450 DEF PROCcopy
460 read=1
470 write=2
480 nosectorscopied=0
490 FOR swaps=0 TO (159 DIV notracks)
500 secstart=swaps*(notracks*secno)
510 nosec=(160*secno)-nosectorscopied
520 IF nosec>notracks*secno THEN nosec
=notracks*secno
530 PROCdisc(read,secstart,nosec)
540 IF source%=dest% THEN
550 PRINT TAB(0,4)"Insert DESTINATION
disc in drive ";dest%;" and press a key"
:VDU7
560 *FX 15
570 REPEAT UNTIL GET
580 PROCblank(4)
590 ENDIF
600 PROCdisc(write,secstart,nosec)
610 nosectorscopied=nosectorscopied+no
sec
620 IF source%=dest% AND nosectorscopi
ed<((160*secno)-1) THEN
```

Continued ▶

◀ Listing 5. Disc copier continued

```
  630 PRINT TAB(0,4);"Enter Source disc
 in drive ";source%;" and press any key
   ":VDU7
  640 *FX 15
  650 REPEAT UNTIL GET
  660 PROCblank(4)
  670 ENDIF
  680 NEXT
  690 ENDPROC
  700 :
  710 DEF PROCassemble
  720 DIM code 50
  730 FOR pass%=0 TO 2 STEP 2
  740 P%=code
  750 [OPT pass%
  760 .mempt:EQUD buffer
  770 .discaddress:EQUD 0
  780 .copylength:EQUD 0
  790 .optype:EQUD 0
  800 .begin
  810 LDR R1,optype
  820 LDR R2,discaddress
  830 LDR R3,mempt
  840 LDR R4,copylength
  850 SWI "XADFS_DiscOp"
  860 MOV PC,R14
  870 ]:NEXT
  880 ENDPROC
  890 :
  900 DEF PROCdisc(operation,start,lengt
 h)
  910 PROCblank(20)
  920 !mempt=buffer-bytessec
  930 !optype=operation
  940 FOR getsectors=0 TO length-1
  950 track=(start+getsectors)DIVsecno
  960 IF noheads=2 THEN
  970 IF track>=80 THEN
  980 head=1
  990 track=track-80
 1000 ELSE head=0
 1010 ENDIF
 1020 ELSE
 1030 head=0
 1040 ENDIF
 1050 IF operation=read THEN
 1060 !discaddress=source%<<29
 1070 ELSE
 1080 !discaddress=dest%<<29
 1090 ENDIF
 1100 !discaddress=!discaddress+(((track
 *noheads)+head)*secno+(getsectors MOD se
 cno))*bytessec
 1110 !mempt=!mempt+bytessec
 1120 !copylength=bytessec
 1130 IF operation=read THEN
 1140 PROCinfo(15,15,"Reading")
 1150 PROCreadsector
 1160 ENDIF
 1170 IF operation=write THEN
 1180 IF badsec?(start+getsectors)=0 THE
 N
 1190 PROCinfo(15,15,"Writing")
 1200 CALL begin
 1210 ENDIF
 1220 ENDIF
 1230 NEXT
 1240 ENDPROC
 1250 :
 1260 DEF PROCreaderror
 1270 PROCinfo(12,20,"Disc Read Error")
 1280 badsec?(start+getsectors)=1
 1290 ENDPROC
 1300 :
 1310 DEF PROCreadsector
 1320 LOCAL ERROR
 1330 badsec?(start+getsectors)=0
 1340 ON ERROR LOCAL PROCreaderror:RESTO
 RE ERROR:ENDPROC
 1350 CALL begin
 1360 RESTORE ERROR
 1370 ENDPROC
 1380 :
 1390 DEF PROCblank(line)
 1400 PRINT TAB(0,line);STRING$(79," ");
 1410 ENDPROC
 1420 :
 1430 DEF PROCchange640
 1440 notracks=(maxmem DIV &1000)
 1450 secno=16
 1460 bytessec=256
 1470 noheads=1
 1480 ENDPROC
 1490 :
 1500 DEF PROCchange800
 1510 notracks=(maxmem DIV &1400)
 1520 secno=5
 1530 bytessec=1024
 1540 noheads=2
 1550 ENDPROC
 1560 :
 1570 DEF PROCinfo(x,y,mess$)
 1580 PRINT TAB(x,y);mess$;"  - Head : "
 ;head;" Track : ";RIGHT$("000"+STR$(trac
 k),3);" Sector : ";RIGHT$("00"+STR$(gets
 ectors MOD secno),2)
 1590 ENDPROC
```

Listing 6. Font file converter

```
   10 REM Agora - listing 6
   20 REM Master-to-Arc font converter
   30 REM by Richard Averill
   40 REM for Archimedes only
   50 REM (c) Acorn User January 1989
   60 :
   70 MODE 0
   80 INPUT " 'CharDes' font file: "font
 $
   90 INPUT "Archimedes font file: "dest
 $
  100 out%=OPENOUT(dest$)
  110 DIM code% 2000
  120 SYS "OS_File",255,font$,code%
  130 x%=32
  140 FOR c%=code% TO code%+94
  150 BPUT# out%,23
  160 BPUT# out%,x%
  170 FOR ra2%=c%+&44 TO c%+&2E4 STEP 96
  180 BPUT# out%,?ra2%
  190 NEXT
  200 x%+=1
  210 NEXT
  220 CLOSE# out%
  230 SYS "OS_File",&12,dest$,&FF7
  240 PRINT "Process complete"
  250 END
```

JOE'S JOTTINGS

See Usercard, page 66

Listing 1. Stack creator

```
   10 REM Usercard Card compiler
   20 REM by Joe Telford
   30 REM for B/B+/M/C/A
   40 REM (c) Acorn User January 1989
   50 :
   60 MODE 4
   70 READ f$
   80 PRINT "Stack is called "f$
   90 :
  100 PROCwritecard(f$)
  110 :
  120 REPEAT
  130 READ cardno$
  140 IF cardno$<>"END" THEN PROCwriteca
rd(cardno$)
  150 UNTIL cardno$="END"
  160 PRINT "All cards written"
  170 END
  180 :
  190 DEF PROCwritecard(f$)
  200 PRINT "creating card"f$
  210 a%=OPENOUT f$
  220 PRINT "writing card"
  230 REPEAT
  240 READ t$
  250 IF t$="RECORDS" READ x:PRINT# a%,t
$,x:UNTIL 0
  260 IF t$="FIND" READ txt$:PRINT# a%,t
$,txt$:UNTIL 0
  270 IF t$="CHECK" READ x,y:PRINT# a%,t
$,x,y:UNTIL 0
  280 IF t$="RADIO" READ x,y:PRINT# a%,t
$,x,y:UNTIL 0
  290 IF t$="FR" READ x,y,l,i,txt$,sx,sy
,chrs,type:PRINT# a%,t$,x,y,l,i,txt$,sx,
sy,chrs,type:UNTIL 0
  300 IF t$="TB" OR t$="RB" READ x,y,l,w
,t,s,a1,a2,b1,b2,txt$:PRINT# a%,t$,x,y,l
,w,t,s,a1,a2,b1,b2,txt$:UNTIL 0
  310 IF t$="R" READ x,y,l,w:PRINT# a%,t
$,x,y,l,w:UNTIL 0
  320 IF t$="D" READ x,y:PRINT# a%,t$,x,
y:UNTIL 0
  330 IF t$="M" READ x,y:PRINT# a%,t$,x,
y:UNTIL 0
  340 IF t$="T" READ x,y,i,txt$:PRINT# a
%,t$,x,y,i,txt$:UNTIL 0
  350 IF t$="F" READ x,y,l,txt$,x,y,l,w,
type:PRINT# a%,t$,x,y,l,txt$,x,y,l,w,typ
e:UNTIL 0
  360 IF t$="FI" READ txt$:PRINT# a%,t$,
txt$:UNTIL 0
  370 IF t$="B" PROCreadbutton
  380 PRINT# a%,t$
  390 UNTIL t$="X"
  400 CLOSE# a%
  410 ENDPROC
  420 :
  430 DATA ENOS
  440 DATA *
  450 DATA RECORDS,23
  460 DATA FIND,ENOSFND
  470 DATA R,1,1,38,22
  480 DATA T,15,1,0,Home Card
  490 DATA R,1,1,38,2
  500 DATA R,1,1,38,2.5
  510 DATA T,6,7,0,"          'E' Numbers"
  520 DATA T,6,8,0,"    and Additives in
Food"
  530 DATA T,6,10,0,"   On test from  Cle
veland"
  540 DATA T,6,11,0," High Technology In
itiative"
  550 DATA T,6,14,0,"    Ann Porter's Ver
sion"
  560 DATA T,6,15,0,"on V1.00 UserCard -
Sept '88"
  570 DATA R,5,6,29,10
  580 DATA TB,2,1,5,1,1,0,10,0,0,0,"Mous
e"
  590 DATA TB,28,1,8,1,1,0,9,0,0,0,"Keyb
oard"
  600 DATA TB,2,18,4,1,1,0,255,0,0,0,"Ex
it"
  610 DATA TB,7,18,12,1,1,0,13,0,0,0,"Ch
ange Stack"
  620 DATA TB,20,18,13,1,1,0,2,0,0,0,"|<
 First Card"
  630 DATA TB,2,20,15,1,1,0,7,0,0,0,"Pri
nt this card"
  640 DATA TB,20,20,15,1,1,0,8,0,0,0,"Pr
int all Cards"
  650 DATA X
  660 :
  670 DATA ENOSBAC
  680 DATA *
  690 DATA R,1,1,38,22
  700 DATA T,3,1,0,'E' Numbers and Addit
ives in Food
  710 DATA R,1,1,38,2
  720 DATA R,1,1,38,2.5
  730 DATA FR,1,5,6,1,E No,8,5,4,4
  740 DATA R,8,5,4,1
  750 DATA FR,14,5,22,1,Hyperactive sens
itive,37,5,1,6
  760 DATA CHECK,37,5
  770 DATA FR,1,7,9,1,Name,11,7,28,5
  780 DATA R,11,7,28,1
  790 DATA FR,1,9,9,1,Found in,11,9,28,2
  800 DATA R,11,9,28,1
  810 DATA FR,1,11,9,1,Uses,11,11,28,3
  820 DATA R,11,11,28,1
  830 DATA FR,1,13,9,1,Comments,11,13,28
,3
  840 DATA R,11,13,28,1
  850 DATA FR,1,15,9,1,Dangers,11,15,28,
3
  860 DATA R,11,15,28,1
  870 DATA TB,2,18,4,1,1,0,1,0,0,0,"Home
"
  880 DATA TB,24,18,2,1,1,0,2,0,0,0,"|<"
  890 DATA TB,27,18,2,1,1,0,5,0,0,0,"<<"
  900 DATA TB,30,18,2,1,1,0,6,0,0,0,"??"
  910 DATA TB,33,18,2,1,1,0,4,0,0,0,">>"
  920 DATA TB,36,18,2,1,1,0,3,0,0,0,">|"
  930 DATA TB,2,20,15,1,1,0,7,0,0,0,"Pri
nt this card"
  940 DATA X
  950 :
  960 DATA ENOSFND
  970 DATA *
  980 DATA R,1,1,38,22
  990 DATA T,3,1,0,'E' Numbers and Addit
ives in Food
 1000 DATA R,1,1,38,2
 1010 DATA R,1,1,38,2.5
 1020 DATA FR,1,5,6,1,E No,8,5,4,4
 1030 DATA R,8,5,4,1
 1040 DATA FR,14,5,22,1,Hyperactive sens
itive,37,5,1,6
 1050 DATA CHECK,37,5
 1060 DATA FR,1,7,9,1,Name,11,7,28,5
 1070 DATA R,11,7,28,1
 1080 DATA FR,1,9,9,1,Found in,11,9,28,2
 1090 DATA R,11,9,28,1
 1100 DATA FR,1,11,9,1,Uses,11,11,28,3
```

Continued ▶

Listing 1. Stack creator continued

```
 1110 DATA R,11,11,28,1
 1120 DATA FR,1,13,9,1,Comments,11,13,28
,3
 1130 DATA R,11,13,28,1
 1140 DATA FR,1,15,9,1,Dangers,11,15,28,
3
 1150 DATA R,11,15,28,1
 1160 DATA TB,2,18,4,1,1,0,1,0,0,0,"Home
"
 1170 DATA TB,18,18,19,1,1,0,14,0,0,0,"F
ind matching cards"
 1180 DATA TB,18,20,20,1,1,0,15,0,0,0,"P
rint matching cards"
 1190 DATA RB,2,20,5,1,2,0,16,0,1,0,"Bri
ef"
 1200 DATA X
 1210 :
 1220 DATA 1
 1230 DATA ENOSBAC
 1240 DATA FI,100
 1250 DATA FI,CHECK
 1260 DATA FI,Curcumin
 1270 DATA FI,Fish fingers/curry powder/
+
 1280 DATA FI,Yellow orange colouring
 1290 DATA FI,Extract of Tumeric Root
 1300 DATA FI,None confirmed
 1310 DATA X
 1320 :
 1330 DATA 2
 1340 DATA ENOSBAC
 1350 DATA FI,101
 1360 DATA FI,CHECK
 1370 DATA FI,Riboflavin (Vitamin B2)
 1380 DATA FI,Sauces/Cereals/Proc. Chees
e
 1390 DATA FI,Involved in Energy Release
 1400 DATA FI,Also found in meat/milk/ve
g
 1410 DATA FI,None
 1420 DATA X
 1430 :
 1440 DATA 3
 1450 DATA ENOSBAC
 1460 DATA FI,102
 1470 DATA FI,CHECKIN
 1480 DATA FI,Tartrazine
 1490 DATA FI,Custard/Jellies/Fizzy Pop
 1500 DATA FI,Artificial chemical dye
 1510 DATA FI,Allergic symptoms possible
 1520 DATA FI,to Asthma/Eczema sufferers
 1530 DATA X
 1540 :
 1550 DATA 4
 1560 DATA ENOSBAC
 1570 DATA FI,104
 1580 DATA FI,CHECKIN
 1590 DATA FI,Quinoline Yellow
 1600 DATA FI,Cakemix/fizzy-pop/
 1610 DATA FI,Artificial chemical dye
 1620 DATA FI,for colouring purposes
 1630 DATA FI,to Asthma/Eczema sufferers
 1640 DATA X
 1650 :
 1660 DATA 5
 1670 DATA ENOSBAC
 1680 DATA FI,107
 1690 DATA FI,CHECKIN
 1700 DATA FI,Yellow 2G
 1710 DATA FI,Sauces/Sweets/Tinned veg.
 1720 DATA FI,Artificial chemical dye
 1730 DATA FI,Banned in USA & EEC
 1740 DATA FI,to Asthma/Eczema sufferers
 1750 DATA X
 1760 :
 1770 DATA 6
 1780 DATA ENOSBAC
 1790 DATA FI,110
 1800 DATA FI,CHECKIN
 1810 DATA FI,Sunset Yellow FCF
 1820 DATA FI,Sauces/Cakes/Jams etc.
 1830 DATA FI,Artificial chemical dye
 1840 DATA FI,General Yellow colouring
 1850 DATA FI,to Asthma/Eczema sufferers
 1860 DATA X
 1870 :
 1880 DATA 7
 1890 DATA ENOSBAC
 1900 DATA FI,120
 1910 DATA FI,CHECKIN
 1920 DATA FI,Cochineal
 1930 DATA FI,Cakes/Icing/Alcoholic Drin
k
 1940 DATA FI,Red dye from cactus insect
s
 1950 DATA FI,Not widely used - expensiv
e
 1960 DATA FI,None known
 1970 DATA X
 1980 :
 1990 DATA 8
 2000 DATA ENOSBAC
 2010 DATA FI,122
 2020 DATA FI,CHECKIN
 2030 DATA FI,Carmoisine
 2040 DATA FI,Cakes/Sauces/Marzipan/Jam
 2050 DATA FI,Artificial red dye
 2060 DATA FI,Widely used
 2070 DATA FI,to Asthma/Eczema sufferers
 2080 DATA X
 2090 :
 2100 DATA 9
 2110 DATA ENOSBAC
 2120 DATA FI,123
 2130 DATA FI,CHECKIN
 2140 DATA FI,Amaranth
 2150 DATA FI,Jam/Soups/Squash/Cakes
 2160 DATA FI,Artificial purple-red dye
 2170 DATA FI,Banned in USA
 2180 DATA FI,to Asthma/Eczema sufferers
 2190 DATA X
 2200 :
 2210 DATA 10
 2220 DATA ENOSBAC
 2230 DATA FI,124
 2240 DATA FI,CHECKIN
 2250 DATA FI,Ponceau 4R
 2260 DATA FI,Sauces/Cake mix/Jam
 2270 DATA FI,Artificial red dye
 2280 DATA FI,Banned in USA
 2290 DATA FI,to Asthma/Eczema sufferers
 2300 DATA X
 2310 :
 2320 DATA 11
 2330 DATA ENOSBAC
 2340 DATA FI,127
 2350 DATA FI,CHECKIN
 2360 DATA FI,Erythrosine
 2370 DATA FI,Glace-cherries/Salami
 2380 DATA FI,Artificial pink-red dye
 2390 DATA FI,Banned in USA
 2400 DATA FI,may cause thyroid problems
 2410 DATA X
 2420 :
 2430 DATA 12
 2440 DATA ENOSBAC
 2450 DATA FI,128
 2460 DATA FI,CHECKIN
```

Continued ▶

JOE'S JOTTINGS

◀ **Listing 1. Stack creator continued**

```
2470 DATA FI,RED 2G
2480 DATA FI,Sausages/Jam/Milk shakes
2490 DATA FI,Artificial red dye
2500 DATA FI,Banned in USA & EEC
2510 DATA FI,may affect red blood cells
2520 DATA X
2530 :
2540 DATA 13
2550 DATA ENOSBAC
2560 DATA FI,131
2570 DATA FI,CHECKIN
2580 DATA FI,Patent Blue V
2590 DATA FI,Scotch eggs/sweets/ice cre
am
2600 DATA FI,Artificial blue dye
2610 DATA FI,May cause reactions:
2620 DATA FI,Nausea, low blood pressure
2630 DATA X
2640 :
2650 DATA 14
2660 DATA ENOSBAC
2670 DATA FI,132
2680 DATA FI,CHECKIN
2690 DATA FI,Indigo Carmine
2700 DATA FI,Swiss roll/cake-decoration
s
2710 DATA FI,Artificial blue dye
2720 DATA FI,May cause reactions:
2730 DATA FI,Nausea, low blood pressure
2740 DATA X
2750 :
2760 DATA 15
2770 DATA ENOSBAC
2780 DATA FI,133
2790 DATA FI,CHECKIN
2800 DATA FI,Brilliant Blue FCF
2810 DATA FI,Mint sauce/fizzy pop/peas
2820 DATA FI,Artificial blue dye
2830 DATA FI,Often mixed with E102
2840 DATA FI,Poss allergic reaction.
2850 DATA X
2860 :
2870 DATA 16
2880 DATA ENOSBAC
2890 DATA FI,142
2900 DATA FI,CHECKIN
2910 DATA FI,Acid Brilliant Green
2920 DATA FI,Mint sauce/fizzy pop/peas
2930 DATA FI,Artificial green dye
2940 DATA FI,Banned in USA
2950 DATA FI,Poss allergic reaction
2960 DATA X
2970 :
2980 DATA 17
2990 DATA ENOSBAC
3000 DATA FI,150
3010 DATA FI,CHECKIN
3020 DATA FI,Caramel
3030 DATA FI,Glace-cherries/Salami
3040 DATA FI,Brown Colouring/flavouring
3050 DATA FI,No definite risk shown but
3060 DATA FI,Poss Vit. B6 deficiency
3070 DATA X
3080 :
3090 DATA 18
3100 DATA ENOSBAC
3110 DATA FI,151
3120 DATA FI,CHECKIN
3130 DATA FI,Black PN
3140 DATA FI,Brown Sauces/gravy granule
s
3150 DATA FI,Artificial purple-black dy
e
3160 DATA FI,Member of the 'Azo' dyes
3170 DATA FI,Poss allergic reaction
3180 DATA X
3190 :
3200 DATA 19
3210 DATA ENOSBAC
3220 DATA FI,153
3230 DATA FI,CHECKIN
3240 DATA FI,Carbon Black
3250 DATA FI,Liquorice/Choc flavours
3260 DATA FI,dye made from burnt plants
3270 DATA FI,Banned in USA
3280 DATA FI,Poss link to skin cancers
3290 DATA X
3300 :
3310 DATA 20
3320 DATA ENOSBAC
3330 DATA FI,154
3340 DATA FI,CHECKIN
3350 DATA FI,Brown FK
3360 DATA FI,Crisps/Smoked fish/gravies
3370 DATA FI,Artif. yellow/brown dye
3380 DATA FI,Restricted use outside UK
3390 DATA FI,Poss cancer & gene changes
3400 DATA X
3410 :
3420 DATA 21
3430 DATA ENOSBAC
3440 DATA FI,155
3450 DATA FI,CHECKIN
3460 DATA FI,Brown HT
3470 DATA FI,Pickles/Choc flavours
3480 DATA FI,Artificial brown dye
3490 DATA FI,Restricted use outside UK
3500 DATA FI,Poss allergic reaction
3510 DATA X
3520 :
3530 DATA 22
3540 DATA ENOSBAC
3550 DATA FI,160a
3560 DATA FI,CHECK
3570 DATA FI,Carotene (Alpha,Beta,Gamma
)
3580 DATA FI,Rice Pud/Salad Dressings
3590 DATA FI,Natural yellow colouring
3600 DATA FI,converted into Vit. A
3610 DATA FI,None recorded
3620 DATA X
3630 :
3640 DATA 23
3650 DATA ENOSBAC
3660 DATA FI,160b
3670 DATA FI,CHECK
3680 DATA FI,Annatto,Bixin,Norbixin
3690 DATA FI,Dried Milk/Yoghurt/cake
3700 DATA FI,Seed pod yellow colouring
3710 DATA FI,Safe alternative to E102
3720 DATA FI,None Recorded
3730 DATA X
3740 :
3750 DATA END
```

Lack of space means that we cannot include the changes to UserCard *which are necessary to enable its use with the AMX mouse. AMX owners might like to use the 'patch' we carried as Top of the List on page 127 of the June 1987 issue.*

JOE'S JOTTINGS

Listing 2. Stack dealer

```
10 REM Usercard Runtime package
20 REM by Joe Telford
30 REM for B/B+/M/C/A
40 REM (c) Acorn User January 1988
50 :
60 REM set M%=1 for acorn VFS (mouse rom)
70 :
80 MODE 129
90 CLOSE# 0
100 M%=0
110 VDU 19,3,0;0;
120 VDU 19,0,7;0;
130 VDU 19,1,0;0;
140 PROCsetup
150 PROCassemble
160 ERF=1
170 ON ERROR PROCerr
180 stack$=FNgetstack
190 fndcard$=stack$
200 CLS
210 file=FNload(stack$)
220 GCOL 4,0:VDU 5:IF M%<>1 MOVE px%,py%:PRINT c$ ELSE *POINTER
230 ON ERROR OFF
240 ERF=2
250 ON ERROR PROCerr
260 :
270 REPEAT
280 actn=0
290 REPEAT
300 PROCmoveptr
310 UNTIL INKEY(0)=13
320 IF M%=1 px%=ADVAL7:py%=ADVAL8:*POINTER 2
330 but=FNcheckbuttons
340 IF but=-1 THEN UNTIL 0
350 SOUND 0,-15,5,0
360 IF b%(but,4)=1 OR b%(but,4)=3 THEN PROCinvert(b%(but,0),b%(but,1),b%(but,2)-b%(but,0),b%(but,3)-b%(but,1))
370 actn=b%(but,6)
380 IF actn=1 THEN PROCrenew:CLS:file=FNload(stack$):PROCdc:UNTIL 0
390 IF actn=2 THEN card=1:PROCget(card):PROCdc:UNTIL 0
400 IF actn=3 THEN card=last:PROCget(card):PROCdc:UNTIL 0
410 IF actn=4 THEN PROCfwd:UNTIL 0
420 IF actn=5 THEN PROCbwd:UNTIL 0
430 IF actn=6 THEN PROCrenew:CLS:file=FNload(fndcard$):PROCdc:UNTIL 0
440 IF actn=7 THEN PROCprinter:PROCdc:PROCdump:PROCdc:UNTIL 0
450 IF actn=8 THEN PROCdumpallcards:UNTIL 0
460 IF actn=9 THEN PROCdc:M%=0:PROCdc:*MOUSE 0
470 IF actn=10 THEN PROCdc:M%=1:PROCdc:*MOUSE 1
480 IF actn=11 THEN PROCget(b%(but,7))
490 IF actn=12 THEN PROCtabularise
500 IF actn=13 THEN RUN
510 IF actn=14 THEN PROCgo(0,brief)
520 IF actn=15 THEN PROCgo(1,brief)
530 IF actn=16 THEN brief=1-brief:PROCbradio
540 UNTIL actn=255:*FX 12,0
550 VDU 4:*FX 4,0
560 dummy=FNok
570 MODE 7:*BASIC
580 END
590 :
600 DEF PROCbradio
610 PROCdc
620 VDU 4
630 PRINT TAB(b%(but,0) DIV 32+1,(1024-b%(but,1)) DIV 32-1);:VDU (132+brief)
640 VDU 5
650 PROCdc
660 ENDPROC
670 :
680 DEF PROCdc
690 IF M%=1 THEN ENDPROC
700 VDU 5:GCOL 4,0
710 MOVE px%,py%:PRINT c$
720 ENDPROC
730 :
740 DEF PROCfwd
750 IF (card+1)>last THEN PROCem("End of Stack - Click a button"):ENDPROC
760 PROCget(card+1):IF file>0 THEN card=card+1
770 IF file=0 THEN PROCem("No card - Click a button"):A$=GET$:PROCget(card)
780 PROCdc:ENDPROC
790 :
800 PROCget(card+1):IF file>0 THEN card=card+1
810 IF file=0 THEN PROCem("No card - Click a button"):A$=GET$:PROCget(card)
820 PROCdc:ENDPROC
830 :
840 DEF PROCbwd
850 IF (card-1)<1 THEN PROCem("Front of Stack - Click a button"):ENDPROC
860 card=card-1
870 PROCget(card)
880 IF file=0 THEN PROCem("No card - Click a button"):card=card+1:PROCget(card)
890 PROCdc:ENDPROC
900 :
910 DEF PROCget(c)
920 fld=0:PROCrenew:CLS
930 file=FNload(STR$c)
940 ENDPROC
950 :
960 DEF PROCerr
970 VDU 3:CLOSE# 0
980 IF ERR=17 AND ERF=2 PROCem("Action Cancelled"):ENDPROC
990 IF ERR=17 AND ERF=1 THEN CLS:ENDPROC
1000 IF ERR=17 AND ERF=3 PROCem("Action Cancelled"):PROCget(card):PROCdc:ERF=2:ENDPROC
1010 REPORT:PRINT'" at ";ERL:*FX 12 0
1020 END
1030 :
1040 DEF PROCinvert(x,y,l,w)
1050 GCOL 4,0
1060 PROCR(x,y,l,w,1)
1070 A$=INKEY$(20)
1080 PROCR(x,y,l,w,1)
1090 GCOL 0,1
1100 ENDPROC
1110 :
1120 DEF FNcheckbuttons
1130 LOCAL bu,flag
1140 IF tbutton=-1 THEN =-1
1150 flag=-1
1160 FOR bu=0 TO tbutton
1170 IF px%>b%(bu,0) THEN IF px%<b%(bu,2) THEN IF py%>b%(bu,1) THEN IF py%<b%(bu,3) THEN flag=bu:bu=tbutton
1180 NEXT
1190 =flag
1200 :
1210 DEF PROCmoveptr
1220 GCOL 4,0
1230 IF INKEY-56 THEN *SDUMP+
1240 IF M%=1 THEN OSCLI("POINTER"):ENDPROC
1250 MOVE px%,py%
1260 IF INKEY-58 AND py%<1024 PRINT c$:py%=py%+8:MOVE px%,py%:PRINT c$:MOVE px%,py%
1270 IF INKEY-42 AND py%>16 PRINT c$:py%=py%-8:MOVE px%,py%:PRINT c$:MOVE px%,p
```

Continued ▶

◀ **Listing 2. Stack dealer continued**

```
y%
1280 IF INKEY-122 AND px%<1264 PRINT c$:px%=px%+8:MOVE px%,py%:PRINT c$:MOVE px%,py%
1290 IF INKEY-26 AND px%>0 PRINT c$:px%=px%-8:MOVE px%,py%:PRINT c$:MOVE px%,py%
1300 ENDPROC
1310 :
1320 DEF PROCsetup
1330 py%=512:px%=640
1340 DIM f$(20),f%(20,3),b%(20,9)
1350 VDU 23,128,248,192,160,144,136,4,2,1
1360 VDU 23,130,255,129,129,129,129,129,129,255
1370 VDU 23,131,255,194,165,153,153,165,194,255
1380 VDU 23,132,60,66,129,129,129,129,66,60
1390 VDU 23,133,60,66,153,189,189,153,66,60
1400 c$=CHR$128
1410 last=0
1420 card=1
1430 brief=0
1440 PROCvalid
1450 PROCrenew
1460 ENDPROC
1470 :
1480 DEF PROCrenew
1490 tfield=-1:tbutton=-1
1500 ENDPROC
1510 :
1520 DEF PROCR(x,y,l,w,f)
1530 MOVE x,y:IF f=0 DRAW x+l,y:DRAW x+l,y+w:DRAW x,y+w:DRAW x,y:ENDPROC
1540 MOVE x+l,y:PLOT 85,x,y+w-4:MOVE x,y+w:MOVE x+l,y+4:PLOT 85,x+l,y+w:MOVE x,y:ENDPROC
1550 :
1560 DEF FNgetstack
1570 REPEAT:REPEAT
1580 PROCdrawwindow(8,8,22,5,1)
1590 PRINT TAB(12,9);"Load Which Stack?"
1600 PRINT TAB(9,13);"or RETURN to Catalogue"
1610 PRINT TAB(16,11);:f$=FNgpi(10,0,al1$)
1620 IF f$="" THEN PROCcat:CLS:UNTIL 0
1630 UNTIL f$>" ":a%=OPENUP f$:CLOSE# a%
1640 IF a%=0 THEN PROCem("No such file! Try cataloging!"):UNTIL 0
1650 UNTIL TRUE:=f$
1660 :
1670 DEF PROCcat
1680 CLS
1690 *CAT
1700 PROCmess("Hit SPACE to return to Stack Loader.",0,0)
1710 REPEAT UNTIL GET=32:CLS
1720 ENDPROC
1730 :
1740 DEF FNload(f$)
1750 LOCAL t$,a%,file
1760 a%=OPENUP f$:IF a%=0 THEN =0
1770 INPUT# a%,t$:IF t$<>"*" THEN file=FNload(t$)
1780 VDU 4
1790 REPEAT
1800 INPUT# a%,t$
1810 IF t$="CHECK" THEN PROClcheck
1820 IF t$="FI" THEN PROCldata
1830 IF t$="RADIO" THEN PROClradio
1840 IF t$="TB" THEN PROCltbut
1850 IF t$="RB" THEN PROClrbut
1860 IF t$="FR" THEN PROClfrect
1870 IF t$="R" THEN PROClrect
1880 IF t$="B" THEN PROClbutton
1890 IF t$="F" THEN PROClfield
1900 IF t$="T" THEN PROCltext
1910 IF t$="D" THEN PROCldraw
1920 IF t$="M" THEN PROClmove
1930 IF t$="RECORDS" THEN INPUT# a%,last
1940 IF t$="FIND" THEN INPUT# a%,fndcard$
1950 UNTIL t$="X"
1960 VDU 5
1970 CLOSE# a%
1980 =a%
1990 :
2000 DEF PROCldata
2010 LOCAL txt$
2020 INPUT# a%,txt$
2030 IF txt$="CHECK" THEN PRINTTAB(f%(fld,0),f%(fld,1));:VDU 130:fld=fld+1:ENDPROC
2040 IF txt$="CHECKIN" THEN PRINTTAB(f%(fld,0),f%(fld,1));:VDU 131:fld=fld+1:ENDPROC
2050 IF txt$="RADIO" THEN PRINTTAB(f%(fld,0),f%(fld,1));:VDU 132:fld=fld+1:ENDPROC
2060 IF txt$="RADIOIN" THEN PRINTTAB(f%(fld,0),f%(fld,1));:VDU 133:fld=fld+1:ENDPROC
2070 PRINT TAB(f%(fld,0),f%(fld,1));LEFT$(txt$,f%(fld,2))
2080 fld=fld+1
2090 ENDPROC
2100 :
2110 DEF PROClcheck
2120 INPUT# a%,x,y
2130 PRINT TAB(x,y);
2140 VDU 130
2150 ENDPROC
2160 :
2170 DEF PROClradio
2180 INPUT# a%,x,y
2190 PRINT TAB(x,y);
2200 VDU 132
2210 ENDPROC
2220 :
2230 DEF PROClrect
2240 INPUT# a%,x,y,l,w
2250 PROCR(x*32-8,1024-(y+w)*32-8,l*32+16,w*32+16,0)
2260 ENDPROC
2270 :
2280 DEF PROCltext
2290 INPUT# a%,x,y,i,txt$
2300 IF i=1 THEN COLOUR 131:COLOUR 0
2310 PRINT TAB(x,y);txt$
2320 COLOUR 128:COLOUR 3
2330 ENDPROC
2340 :
2350 DEF PROClfrect
2360 INPUT# a%,x,y,l,i,txt$,sx,sy,chrs,type
2370 PROCR(x*32-8,1024-(y+1)*32-8,l*32+16,32+16,0)
2380 IF i=1 THEN COLOUR 131:COLOUR 0
2390 PRINT TAB(x,y);txt$;":";
2400 COLOUR 128:COLOUR 3
2410 tfield=tfield+1
2420 f$(tfield)=txt$
2430 f%(tfield,0)=sx
2440 f%(tfield,1)=sy
2450 f%(tfield,2)=chrs
2460 f%(tfield,3)=type
2470 ENDPROC
2480 :
2490 DEF PROCltbut
2500 INPUT# a%,x,y,l,w,t,s,a1,a2,b1,b2,txt$
2510 PROCR(x*32-8,1024-(y+1)*32-8,l*32+16,32+16,0)
2520 PRINT TAB(x,y);txt$
```

Continued ▶

◀ **Listing 2. Stack dealer continued**

```
2530 tbutton=tbutton+1
2540 b%(tbutton,0)=x*32-8
2550 b%(tbutton,1)=1024-(y+w)*32-8
2560 b%(tbutton,2)=(x+1)*32+8
2570 b%(tbutton,3)=1024-(y*32)+8
2580 b%(tbutton,4)=t
2590 b%(tbutton,5)=s
2600 b%(tbutton,6)=a1
2610 b%(tbutton,7)=a2
2620 b%(tbutton,8)=b1
2630 b%(tbutton,9)=b2
2640 ENDPROC
2650 :
2660 DEF PROClrbut
2670 INPUT# a%,x,y,l,w,t,s,a1,a2,b1,b2,
txt$
2680 PRINT TAB(x,y);txt$;:VDU 32,132+br
ief
2690 tbutton=tbutton+1
2700 b%(tbutton,0)=(x+l+1)*32-8
2710 b%(tbutton,1)=1024-(y+w)*32-8
2720 b%(tbutton,2)=(x+l+2)*32+8
2730 b%(tbutton,3)=1024-(y*32)+8
2740 b%(tbutton,4)=t
2750 b%(tbutton,5)=s
2760 b%(tbutton,6)=a1
2770 b%(tbutton,7)=a2
2780 b%(tbutton,8)=b1
2790 b%(tbutton,9)=b2
2800 ENDPROC
2810 :
2820 DEF PROClmove
2830 INPUT# a%,x,y
2840 MOVE x,y
2850 ENDPROC
2860 :
2870 DEF PROCldraw
2880 INPUT# a%,x,y
2890 DRAW x,y
2900 ENDPROC
2910 :
2920 DEF PROCmess(t$,x,y)
2930 PROCdrawwindow(x,y,LEN(t$),0,1)
2940 COLOUR 128:COLOUR 7
2950 PRINT TAB(x+1,y+1);t$;
2960 ENDPROC
2970 :
2980 DEF FNok
2990 SOUND 1,1,4,10
3000 PROCmess("Press a button to exit o
r ESCAPE",4,29)
3010 dummy=GET
3020 PROCcem
3030 =-1
3040 :
3050 DEF PROCdrawwindow(x,y,w,n%,f)
3060 LOCAL a
3070 GCOL 0,0:PROCR(x*32,1024-((y+n%+3)
*32),(w+2)*32,(n%+3)*32,1)
3080 IF f=0 THEN ENDPROC
3090 GCOL 1,1:PROCR(x*32+16,1024-((y+n%
+2)*32+16),(w+1)*32,(n%+2)*32,0)
3100 PROCR(x*32+24,1024-((y+n%+2)*32+24
),(w+1)*32,8,1)
3110 PROCR((x+w+2)*32-16,1024-((y+n%+2)
*32+24),8,(n%+2)*32,1)
3120 ENDPROC
3130 :
3140 DEF FNgpi(len,effect,valid$)
3150 LOCAL a$,b
3160 a$=""
3170 PRINT STRING$(len,".");STRING$(len
,CHR$(8));:*FX 15,1
3180 b=GET:IF b=13 THEN =a$
3190 IF b<32 THEN 3180
3200 IF b=127 AND a$="" THEN 3180
3210 IF b=127 a$=LEFT$(a$,LEN(a$)-1):PR
INTCHR$b;".";CHR$(8);:GOTO 3180
3220 IF effect=0 THEN 3250
3230 IF effect=1 b=b AND 223 ELSE b=b O
R 32
3240 IF effect=3 AND(RIGHT$(a$,1)=" " O
R a$="") b=b AND 223
3250 IF LEN(a$)=len OR INSTR(valid$,CHR
$b)=0 SOUND 1,1,4,20:GOTO 3180
3260 PRINT CHR$b;:a$=a$+CHR$b:GOTO 3180
3270 :
3280 DEF PROCvalid
3290 cap$=" ABCDEFGHIJKLMNOPQRSTUVWXYZ"
3300 low$=" abcdefghijklmnopqrstuvwxyz"
3310 nos$=".0123456789"
3320 pun$=" -_!#$%&'()=?/*:+;.,<>"+CHR$
34
3330 all$=nos$+cap$+low$+pun$
3340 ENDPROC
3350 :
3360 DEF PROCem(t$)
3370 SOUND 1,1,4,10
3380 PROCmess(t$,20-INT((LENt$)/2)-1,29
)
3390 A$=INKEY$(200)
3400 PROCcem
3410 ENDPROC
3420 :
3430 DEF PROCcem
3440 VDU 4
3450 PRINT TAB(0,29);STRING$(119," ");
3460 VDU 5
3470 ENDPROC
3480 :
3490 DEF PROCdump
3500 CALL start
3510 ENDPROC
3520 :
3530 DEF PROCdumpallcards
3540 PROCprinter
3550 LOCAL c
3560 file=FNload(stack$)
3570 PROCdump
3580 FOR c=1 TO last
3590 PROCget(c)
3600 PROCdump
3610 NEXT
3620 CLS:file=FNload(stack$)
3630 PROCdc
3640 ENDPROC
3650 :
3660 DEF PROCprinter
3670 PROCmess("Setup printer then press
 a button",3,29)
3680 REPEAT UNTIL GET
3690 PROCcem
3700 ENDPROC
3710 :
3720 DEF PROCgo(p,b)
3730 ERF=3
3740 IF p=1 THEN PROCprinter
3750 LOCAL c,match,hit
3760 hit=0
3770 target$=FNwhat
3780 IF target$="" THEN PROCget(card):P
ROCdc:ENDPROC
3790 IF b=1 VDU 4:CLS:VDU3-p:PRINT "Sea
rching for: "target$
3800 FOR c=1 TO last
3810 IF b=0 PROCmess("Searching Card: "
+STR$c,11,29)
3820 match=FNsearchget(c,target$,b)
3830 IF match=TRUE AND b=0 THEN PROCget
(c):hit=c
3840 IF match=TRUE AND b=1 THEN PRINT"f
ound: ";brief$
3850 IF match=TRUE AND p=1 AND b=0 THEN
 PROCdump
3860 IF match=TRUE AND p=0 AND b=0 THEN
 PROCsfn(" Press a button for next card
")
3870 NEXT
3880 VDU 3
3890 PROCsfn("No more cards - Press a b
```

Continued ▶

JOE'S JOTTINGS

◄ Listing 2. Stack dealer continued

```
utton")
 3900 IF hit>0 THEN card=hit
 3910 PROCget(card):PROCdc
 3920 ERF=2
 3930 ENDPROC
 3940 :
 3950 DEF FNwhat
 3960 VDU 4
 3970 PROCdrawwindow(8,8,22,5,1)
 3980 PRINT TAB(14,9);"Search for?"
 3990 PRINT TAB(11,13);"or RETURN to can
cel"
 4000 PRINT TAB(9,11);
 4010 =FNgpi(22,0,all$)
 4020 :
 4030 DEF PROCsfn(t$)
 4040 PROCcem
 4050 PROCmess(t$,5,29)
 4060 REPEAT UNTIL GET
 4070 PROCcem
 4080 ENDPROC
 4090 :
 4100 DEF FNsearchget(c,target$,b)
 4110 =FNgetload(STR$c,target$,b)
 4120 :
 4130 DEF FNgetload(f$,target$,b)
 4140 LOCAL t$,a%,flag,x,x$,cfld
 4150 cfld=0:brief$=""
 4160 a%=OPENUP f$:IF a%=0 THEN =0
 4170 INPUT# a%,t$:VDU 4:flag=0
 4180 REPEAT:INPUT# a%,t$
 4190 IF t$="CHECK" THEN INPUT# a%,x,x:U
NTIL 0
 4200 IF t$="RADIO" THEN INPUT# a%,x,x:U
NTIL 0
 4210 IF t$="TB" THEN INPUT# a%,x,x,x,x,
x,x,x,x,x,x,x$:UNTIL 0
 4220 IF t$="FR" THEN INPUT# a%,x,x,x,x,
x$,x,x,x,x:UNTIL 0
 4230 IF t$="R" THEN INPUT# a%,x,x,x,x:U
NTIL 0
 4240 IF t$="B" THEN UNTIL 0
 4250 IF t$="F" THEN UNTIL 0
 4260 IF t$="T" THEN INPUT# a%,x,x,x,x$:
UNTIL 0
 4270 IF t$="D" THEN INPUT# a%,x,y:UNTIL
 0
 4280 IF t$="M" THEN INPUT# a%,x,y:UNTIL
 0
 4290 IF t$="RECORDS" THEN INPUT# a%,x:U
NTIL 0
 4300 IF t$="FIND" THEN INPUT# a%,x$ :UN
TIL 0
 4310 IF t$="FI" THEN flag=FNcompdata(ta
rget$,b)
 4320 UNTIL t$="X" OR flag=TRUE
 4330 CLOSE# a%:=flag
 4340 :
 4350 DEF FNcompdata(t$,b):LOCAL txt$,fl
ag
 4360 INPUT# a%,txt$:tt$=txt$:IF tt$="CH
ECK" THEN tt$="   "
 4370 IF tt$="CHECKIN" THEN tt$=" X "
 4380 IF cfld<3 THEN brief$=brief$+tt$+"
/":cfld=cfld+1
 4390 IF LENbrief$ >=73 AND p=1 THEN bri
ef$=LEFT$(brief$,72):cfld=3
 4400 IF LENbrief$ >=33 AND p=0 THEN bri
ef$=LEFT$(brief$,32):cfld=3
 4410 IF INSTR(txt$,t$)>0 THEN flag=TRUE
 4420 =flag
 4430 :
 4440 DEF PROCassemble
 4450 DIM start &110
 4460 OSWORD=&FFF1
 4470 OSWRCH=&FFEE
 4480 byte=&70
 4490 pk=&71
 4500 Vlo=&72
 4510 Vhi=&73
 4520 Hlo=&74
 4530 Hhi=&75
 4540 Vblo=&76
 4550 Vbhi=&77
 4560 pixel=&78
 4570 FOR pass=0 TO 3 STEP 3
 4580 P%=start
 4590 [OPT 0
 4600 .start
 4610 LDA #25:JSR OSWRCH
 4620 LDA #4:JSR OSWRCH
 4630 LDX #4
 4640 .oloop
 4650 LDA #0:JSR OSWRCH
 4660 DEX
 4670 BEQ oloop
 4680 LDA #29:JSR OSWRCH
 4690 LDA #4:JSR OSWRCH
 4700 LDX #4
 4710 .Aloop
 4720 LDA #0:JSR OSWRCH
 4730 DEX
 4740 BEQ Aloop
 4750 LDA #2:JSR OSWRCH
 4760 JSR out1:LDA #27:JSR OSWRCH
 4770 JSR out1:LDA #65:JSR OSWRCH
 4780 JSR out1:LDA #8:JSR OSWRCH
 4790 JSR out1:LDA #10:JSR OSWRCH
 4800 :
 4810 LDA #1020 DIV 256:STA Vhi
 4820 LDA #1020 MOD 256:STA Vlo
 4830 .nextrow
 4840 JSR startrow
 4850 LDA #0:STA Hhi:STA Hlo
 4860 .rowloop
 4870 LDA #0:STA byte:STA pk
 4880 .pkloop
 4890 SEC
 4900 LDA Vlo:SBC pk:STA Vblo
 4910 LDA Vhi:SBC #0:STA Vbhi
 4920 LDA #9:LDX #Hlo:LDY #0:JSR OSWORD
 4930 LDA pixel:BEQ over
 4940 LDA #1:STA pixel
 4950 .over
 4960 CLC:ROL byte
 4970 CLC:LDA byte:ADC pixel:STA byte
 4980 CLC:LDA pk:ADC #4:STA pk
 4990 CMP #32:BNE pkloop
 5000 JSR out1:LDA byte:JSR OSWRCH
 5010 JSR out1:LDA byte:JSR OSWRCH
 5020 CLC
 5030 LDA Hlo:ADC #4:STA Hlo
 5040 LDA Hhi:ADC #0:STA Hhi
 5050 CMP #5
 5060 BNE rowloop
 5070 JSR out1:LDA #10:JSR OSWRCH
 5080 SEC
 5090 LDA Vlo:SBC #32:STA Vlo
 5100 LDA Vhi:SBC #0:STA Vhi
 5110 BMI over2
 5120 JMP nextrow
 5130 .over2
 5140 JSR out1:LDA #27:JSR OSWRCH
 5150 JSR out1:LDA #64:JSR OSWRCH
 5160 LDA #3:JSR OSWRCH
 5170 RTS
 5180 .out1
 5190 LDA #1:JSR OSWRCH
 5200 RTS
 5210 :
 5220 .startrow
 5230 JSR out1:LDA #27:JSR OSWRCH
 5240 JSR out1:LDA #76:JSR OSWRCH
 5250 JSR out1:LDA #128:JSR OSWRCH
 5260 JSR out1:LDA #2:JSR OSWRCH
 5270 RTS
 5280 ]
 5290 NEXT
 5300 ENDPROC
```

See Maps, page 85

Listing 1. Maps

```
   10 REM Listing 1: Maps
   20 REM by Peter Voke
   30 REM for BBC B/B+/M/C/E
   40 REM (c) Acorn User Janua
ry 1988
   50 :
   60 MODE 1:HIMEM=&1F00:DIM C
(3)
   70 REPEAT:VDU 4,20,12,10
   80 INPUT "RANDOM SEED",S%
   90 IF S%>0 S%=RND(-S%) ELSE
 S%=RND(-TIME)
  100 CLS
  110 VDU 19,0,0;0;:C(0)=4
  120 VDU 19,3,4;0;:C(3)=5
  130 VDU 19,2,3;0;:C(2)=2
  140 VDU 19,1,2;0;:C(1)=3
  150 VDU 23,224,0,20,0,85,0,8
5,0,0
  160 VDU 23,225,0,0,170,0,170
,0,40,0
  170 FOR I%=226 TO 229
  180 VDU 23,I%,RND(64),RND(64
),RND(64),RND(64),RND(64),RND(
64),RND(64),RND(64)
  190 NEXT
  200 VDU 23,230,0,0,0,16,0,0,
0,0
  210 VDU 5:GCOL 0,3:FOR Y%=8
TO 1024 STEP 12:MOVE 0,Y%:DRAW
 1280,Y%:NEXT
  220 ?&1F01=1:?&1F02=2:FOR I%
=3 TO 10
  230 IF I%?&1EFF=2:I%?&1F00=R
ND(3) ELSE I%?&1F00=2
  240 NEXT
  250 A%=1:B%=16+RND(31):R%=4+
RND(2)
  260 FOR X%=4 TO 76
  270 A%=A%+RND(R%)-3:B%=B%+RN
D(7)-4
  280 IF A%<-1:A%=1:B%=16+RND(
31)
  290 IF A%>24:A%=A%-1
  300 IF B%+A%>60:B%=B%-2
  310 IF B%-A%<4:B%=B%+2
  320 IF A%>76-X%:A%=A%-2
  330 IF A%<=0 THEN B%=16+RND(
31):GOTO 450
  340 FOR Z%=-A% TO A%:Y%=B%+Z
%
  350 I%=X%*16+RND(16):J%=Y%*1
6+RND(16)
  360 GCOL 0,1
  370 MOVE I%,J%:IF A%<2 VDU 2
30:GOTO 420
  380 IF ABS(Z%)=A%:VDU 225+RN
D(4):GOTO 420
  390 GCOL 0,?(&1F01+(A%+1-ABS
(Z%))/8):VDU 225
  400 VDU 8
  410 GCOL 0,?(&1F01+(A%+5-ABS
(Z%))/8):VDU 224
  420 NEXT:IF RND(8)<8 THEN 45
0
  430 IF B%-A%>30:MOVE I%,RND(
512):VDU 230
  440 IF B%+A%<30:MOVE I%,1024
-RND(512):VDU 230
  450 NEXT
  460 *FX 15
  470 REPEAT:Z=GET-48
  480 IF Z>-1 AND Z<4 THEN C(Z
)=(C(Z)+1) MOD 8:VDU 19,Z,C(Z)
;0;
  490 UNTIL Z>9
  500 UNTIL 0
```

Listing 2. Planets

```
   10 REM Listing 2: Planets
   20 REM by Peter Voke
   30 REM for BBC B/B+/M/C/E
   40 REM (c) Acorn User Janua
ry 1989
   50 :
   60 MODE 7
   70 INPUT "Seed Number",s%:S
%=RND(-s%)
   80 PRINT''"Planet Type:"''"
M V E M J S U N P"'"1 2 3 4 5
6 7 8 9"
   90 INPUT T%:IF T%<1 OR T%>9
 THEN 80
  100 INPUT "Subtype 1 TO 4:"t
%
  110 IF t%<1 OR t%>4 THEN 100
  120 IF T%>4 AND T%<9:Q%=t%+(
T%-5)*4:INPUT "Moon Type 1 TO
4:"t%
  130 IF Q%>12 Q%=Q%-4
  140 R%=(T%-1)*4+t%
  150 PRINT'"Terrain:"'"1. con
toured"'"2. flat"'"3. sea"
  160 INPUT L%:IF L%<1 OR L%>3
 THEN 150
  170 B%=2:IF L%=2 THEN B%=3
  180 PRINT'"1. unbroken"'"2.
broken"
  190 IF L%=2 PRINT "3. recedi
ng"
  200 INPUT G%:IF G%>3 OR G%<1
 THEN 180
  210 H%=64:IF L%=3:H%=0
  220 RESTORE (1320+R%*10)
  230 READ C1,C2,C3,C4,C5,C6,C
7,C8,C9,C10
  240 IF L%=3 THEN C9=C1:C1=C3
:C2=C3
  250 DX%=RND(8)*12
  260 V%=H%/4
  270 MODE 2:VDU 23;11;0;0;0;
  280 PROCsky
  290 PROCground
  300 IF H% PROChills
  310 IF R%>8 AND R%<12 THEN P
ROCdwell
  320 *FX15 1
  330 U=GET:RUN
  340 :
  350 DEF PROCsky
  360 IF C5=0 AND C6=0:GCOL 0,
C8:FOR I%=1 TO 50:PLOT 69,RND(
1280),RND(512)+512:NEXT:PROCpl
anet:ENDPROC
  370 PROCplanet
  380 GCOL 1,C5
  390 MOVE 0,512:MOVE 1280,512
  400 PLOT 85,1,1024:PLOT 85,1
280,1024
  410 GCOL 0,C6
  420 FOR Y%=512 TO 1024 STEP
12
  430 MOVE 0,Y%:DRAW 1280,Y%
  440 NEXT
  450 ENDPROC
  460 :
  470 DEF PROChills
  480 J%=512:K%=0:Y%=512+RND(H
%)
  490 X%=K%*320
  500 MOVE X%,Y%:MOVE X%,J%
  510 REPEAT U%=X%:W%=Y%
  520 X%=X%+DX%
  530 Y%=Y%+RND(V%)-V%/2
  540 IF Y%<J%:Y%=1024-Y%
  550 GCOL 0,C9
  560 PLOT 85,X%,Y%:PLOT 85,X%
,J%
  570 GCOL 0,C10
  580 MOVE U%,W%+4
  590 DRAW X%,Y%+4
  600 MOVE X%,J%
  610 UNTIL X%>1280
  620 K%=K%+1:Y%=512-K%*8:V%=V
%*2:J%=Y%
  630 IF K%<4 AND RND(2)=1 THE
N 490
  640 ENDPROC
  650 :
  660 DEF PROCground
  670 GCOL 0,C4
  680 GCOL 0,C4
  690 MOVE 0,508:DRAW 1280,508
  700 IF C1:GCOL 0,C1:FOR Y%=0
 TO 504 STEP 8:MOVE 0,Y%:DRAW
1280,Y%:NEXT
  710 IF C2:GCOL 0,C2:FOR Y%=4
 TO 504 STEP 8:MOVE 0,Y%:DRAW
1280,Y%:NEXT
  720 IF G%=3:O%=RND(1280):GCO
L 0,C4:MOVE 0,504:MOVE O%-8*64
0,0:PLOT 85,O%-640,504:FOR X%=
-640 TO 640 STEP 16:MOVE O%+X%
,504:DRAW O%+8*X%,0:NEXT:MOVE
1280,504:PLOT 85,O%+640,504:EN
DPROC
  730 I%=RND(64)
  740 FOR K%=15 TO 1 STEP-1
  750 IF K% MOD 2=0:GCOL 0,C3:
ELSE GCOL 0,C4
  760 S%=1280/(2*K%+1):Y%=548-
S%
  770 X%=S%:MOVE 0,Y%
  780 FOR J%=-K% TO K%
  790 IF L%>1:D%=0:ELSE D%=(K%
-J%+I%) MOD 8*S%/32
  800 D%=D%*(I% MOD 2*2-1)
  810 IF G%=1:DRAW X%+S%,Y%-D%
:ELSE MOVE RND(1280),Y%:PLOT 1
,RND(S%*4)-S%*2,-D%/2
  820 X%=X%+S%
  830 NEXT:NEXT
  840 ENDPROC
  850 :
  860 DEF FNc(C%)
  870 =(C% AND 1)+(C% AND 2)*2
+(C% AND 4)*4+(C% AND 8)*8
  880 :
  890 DEF PROCplanet
  900 LOCAL A%,B%
  910 IF R%>32:ENDPROC
  920 IF R%<17 CA=3:CB=3:CC=3:
r%=350-R%*16:GOTO 950
  930 RESTORE (1690+Q%*10):REA
D CA,CB,CC
  940 r%=150+RND(256)
  950 x%=RND(1280):y%=500+RND(
256)
  960 z%=0
  970 IF y%>512:z%=512-y%:IF y
%-r%>512:z%=-r%
  980 FOR Y%=z% TO r% STEP 4
  990 X%=SQR(r%*r%-Y%*Y%)+8
 1000 A%=RND(2*X%)-X%
 1010 B%=RND(2*X%)-X%
 1020 IF B%<A%:C%=A%:A%=B%:B%=
C%
 1030 MOVE x%-X%,y%+Y%
 1040 GCOL 0,CA:DRAW x%+A%,y%+
Y%
 1050 GCOL 0,CB:DRAW x%+B%,y%+
Y%
 1060 GCOL 0,CC:DRAW x%+X%,y%+
Y%
 1070 NEXT
 1080 IF R%<21 ENDPROC
 1090 GCOL 0,7
 1100 o%=RND(1024)
 1110 MOVE x%+o%,1024:DRAW x%-
o%*(y%-512)/(1024-y%),512
 1120 ENDPROC
 1130 :
 1140 DEF PROCdwell
 1150 IF L%=3 ENDPROC
```

Continued ▶

◀ Listing 2. Planets continued

```
1160 MOVE 320,500
1170 FOR I%=1 TO 9
1180 J%=RND(8):RESTORE (1820+
J%*10)
1190 READ X1,Y1,X2,Y2,X3,C
1200 X1=X1*4:Y1=Y1*4
1210 X2=X2*4:Y2=Y2*4:X3=X3*4
1220 IF C:GCOL 0,0:ELSE GCOL
0,7
1230 PLOT 1,X1,Y1:PLOT 1,X2,Y
2
1240 PLOT 1,X3,-Y1-Y2:PLOT 1,
-X1-X2-X3,0
1250 GCOL 0,RND(4)
1260 PLOT 0,8,4:PLOT 0,X1,Y1-
8
1270 PLOT 81,X2+X3-16,8-Y1
1280 PLOT 81,-X3,Y1+Y2-8
1290 PLOT 0,8-X1-X2,4-Y1-Y2
1300 PLOT 0,RND(256)-128,(RND
(2)-1)*-4
1310 NEXT:ENDPROC
1320 REM  line 220 must point
here
1330 DATA 7,3,7,4,0,0,0,3,0,6
:REM MERC
1340 DATA 3,1,3,1,0,0,0,7,0,5
1350 DATA 0,3,3,4,0,0,0,7,4,6
1360 DATA 4,4,3,5,0,0,0,6,4,1
1370 DATA 7,7,6,1,6,1,7,0,0,6
:REM VENUS
1380 DATA 7,6,2,5,6,4,6,0,5,0
1390 DATA 7,6,4,0,6,7,5,5,0,7
1400 DATA 6,6,7,5,7,2,5,7,4,0
1410 DATA 2,3,4,2,0,4,0,6,5,2
:REM EARTH
1420 DATA 0,2,4,3,0,4,0,0,2,3
1430 DATA 6,2,4,2,0,4,0,4,2,7
1440 DATA 2,4,4,3,4,0,4,7,0,2
1450 DATA 5,1,1,4,0,1,0,5,0,6
:REM MARS
1460 DATA 3,1,1,2,0,1,0,0,1,2
1470 DATA 5,1,0,4,0,0,0,1,5,7
1480 DATA 1,0,1,2,0,0,0,5,0,4
1490 DATA 7,6,2,4,0,0,0,7,7,6
:REM ICE
1500 DATA 7,7,1,4,0,0,0,7,7,2
:REM SNOW
1510 DATA 7,0,0,1,0,0,0,6,0,5
:REM DIRTY
1520 DATA 6,4,4,2,0,4,0,0,4.7
:REM H20
1530 DATA 0,0,4,7,0,0,0,4,0,5
:REM Ni
1540 DATA 0,0,2,4,0,0,0,7,0,6
:REM A1O
1550 DATA 0,0,6,7,0,0,0,7,7,3
:REM SiO
1560 DATA 0,0,1,5,0,0,0,7,0,1
:REM FeO
1570 DATA 0,6,4,5,0,6,0,0,0,2
:REM NH3+
1580 DATA 0,4,6,5,0,0,0,7,0,5
:REM NH3
1590 DATA 0,0,1,4,0,5,0,0,0,1
:REM CH4+
1600 DATA 0,0,4,1,0,0,0,7,0,4
:REM CH4
1610 DATA 0,3,4,2,0,3,0,0,0,7
:REM H2S+
1620 DATA 0,0,3,7,0,0,0,3,0,2
:REM H2S
1630 DATA 0,0,0,0,0,0,0,7,0,7
:REM C
1640 DATA 0,0,7,0,0,0,0,6,0,4
:REM ROCK
1650 DATA 0,1,4,5,0,0,0,7,0,1
:REM PLUTO
1660 DATA 0,4,1,2,0,0,0,7,0,4
1670 DATA 0,4,4,2,0,2,0,0,6,3
1680 DATA 0,4,7,1,0,5,0,0,0,6
1690 REM line 930 must point
here
1700 DATA 7,3,5:REM JUPITER
1710 DATA 3,6,2
1720 DATA 2,6,5
1730 DATA 7,3,2
1740 DATA 3,1,5:REM SATURN
1750 DATA 3,4,5
1760 DATA 2,4,5
1770 DATA 5,4,1
1780 DATA 1,4,4:REM URANUS/NE
PTUNE
1790 DATA 5,4,4
1800 DATA 6,4,4
1810 DATA 6,4,5
1820 REM line 1180 must point
here
1830 DATA 0,5,8,0,0,7:REM DWE
LLINGS
1840 DATA 1,7,7,1,1,3
1850 DATA 0,6,15,0,2,5
1860 DATA 2,8,11,1,2,2
1870 DATA 4,15,4,1,2,7
1880 DATA 0,15,8,0,0,1
1890 DATA 2,10,4,10,5,4
1900 DATA 0,15,6,15,4,7
1910 DATA 3,6,15,0,3,1
```

Listing 3. Mazes

```
10 REM Listing 3: Maze Game
20 REM By Peter Voke
30 REM for BBC B use PAGE=&
1100
40 REM (c) Acorn User Janua
ry 1989
50 :
60 MODE 130:VDU 23;11;0;0;0
;
70 @%=3:*FX 4 1
80 *FX 9 0
90 V%=500:I%=8:J%=8:G%=0:S%
=0
100 DIM D$(8)
110 DIM M%(15,15)
120 D$(8)="N":D$(4)="E"
130 D$(2)="S":D$(1)="W"
140 PROCM:G%=9
160 REPEAT
170 FOR K%=1 TO 6
180 VDU 19,K%,1+(V%+K%) MOD
6;0;
190 NEXT
200 IF G%=81:PROCQ:GOTO 380
210 IF G%>127 OR G%=13 OR G%
=9 THEN 300
220 IF G%<49 OR G%>576 G%=49
230 FOR T%=49 TO G%
240 IF FNC(I%,J%,D%)=0:VDU 7
:T%=G%:GOTO 290
250 IF D%=1 I%=I%-1
260 IF D%=4 I%=I%+1
270 IF D%=2 J%=J%-1
280 IF D%=8 J%=J%+1
290 NEXT
300 IF G%=9 S%=S%+R%:Q%=&900
+I%*16+J%:?Q%=?Q% OR &80
310 IF G%=137 D%=D%/2:IF D%=
0:D%=8
320 IF G%=136 D%=D%*2:IF D%=
16:D%=1
330 IF G%=13 D%=D%*4:IF D%>8
:D%=D%/16
340 IF G%<>138 THEN 360
350 IF FNC(I%,J%,16)=0:VDU 7
:ELSE V%=V%-1:PROCM:D%=4:G%=9:
VDU 4:UNTIL FALSE
360 IF G%<>139 THEN 380
370 IF FNC(I%,J%,32)=0:VDU 7
:ELSE V%=V%+1:PROCM:D%=4:G%=9:
VDU 4:UNTIL FALSE
380 CLS:W%=0
390 IF FNC(I%,J%,16):PROCT(1
)
400 IF FNC(I%,J%,32):PROCU(1
)
410 IF D%=1 PROC1
420 IF D%=2 PROC2
430 IF D%=4 PROC4
440 IF D%=8 PROC8
450 PRINT TAB(7,1)D$(D%),S%
460 G%=INKEY 0:IF G%<0 THEN
460
470 UNTIL FALSE
480 :
490 DEF PROC1
500 K%=I%+1:L%=J%
510 REPEAT:K%=K%-1
520 IF FNC(K%,L%,8)=0 PROCW(
1,I%-K%+1)ELSE IF FNC(K%,L%+1,
1) PROCD(1,I%-K%+2,12)ELSE PRO
CD(1,I%-K%+2,14)
530 IF FNC(K%,L%,2)=0 PROCW(
-1,I%-K%+1)ELSE IF FNC(K%,L%-1
,1) PROCD(-1,I%-K%+2,12) ELSE
PROCD(-1,I%-K%+2,14)
540 UNTIL FNC(K%,L%,1)=0
550 PROCE(I%-K%+2):ENDPROC
560 :
570 DEF PROC4
580 K%=I%-1:L%=J%
590 REPEAT:K%=K%+1
600 IF FNC(K%,L%,2)=0 PROCW(
1,K%-I%+1) ELSE IF FNC(K%,L%-1
,4) PROCD(1,K%-I%+2,12) ELSE P
ROCD(1,K%-I%+2,14)
610 IF FNC(K%,L%,8)=0 PROCW(
-1,K%-I%+1)ELSE IF FNC(K%,L%+1
,4) PROCD(-1,K%-I%+2,12) ELSE
PROCD(-1,K%-I%+2,14)
620 UNTIL FNC(K%,L%,4)=0
630 PROCE(K%-I%+2):ENDPROC
640 :
650 DEF PROC2
660 K%=I%:L%=J%+1
670 REPEAT:L%=L%-1
680 IF FNC(K%,L%,1)=0 PROCW(
1,J%-L%+1) ELSE IF FNC(K%-1,L%
,2) PROCD(1,J%-L%+2,12) ELSE P
ROCD(1,J%-L%+2,14)
690 IF FNC(K%,L%,4)=0 PROCW(
-1,J%-L%+1) ELSE IF FNC(K%+1,L
%,2) PROCD(-1,J%-L%+2,12) ELSE
 PROCD(-1,J%-L%+2,14)
700 UNTIL FNC(K%,L%,2)=0
710 PROCE(J%-L%+2):ENDPROC
720 :
730 DEF PROC8
740 K%=I%:L%=J%-1
750 REPEAT:L%=L%+1
760 IF FNC(K%,L%,4)=0 PROCW(
1,L%-J%+1) ELSE IF FNC(K%+1,L%
,8) PROCD(1,L%-J%+2,12) ELSE P
ROCD(1,L%-J%+2,14)
770 IF FNC(K%,L%,1)=0 PROCW(
-1,L%-J%+1) ELSE IF FNC(K%-1,L
%,8) PROCD(-1,L%-J%+2,12)ELSE
PROCD(-1,L%-J%+2,14)
780 UNTIL FNC(K%,L%,8)=0
790 PROCE(L%-J%+2)
800 ENDPROC
810
820 DEF FNC(X%,Y%,D%)
830 Q%=&900+X%*16+Y%
840 =(?Q%) AND D%
850 :
860 REM VERTICAL
870 DEF PROCV(S%,Z%,T%)
880 H%=512/Z%
890 P%=640+S%*614/Z%
900 PLOT T%,P%,508-H%
910 PLOT T%,P%,508+H%
920 ENDPROC
930 :
940 REM HORIZONTAL
```

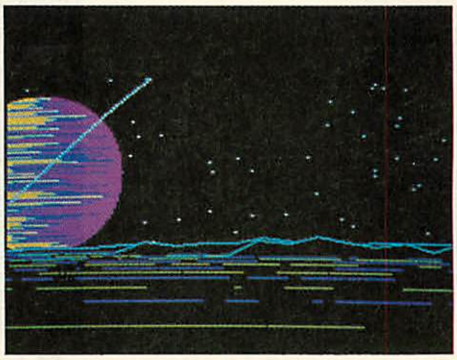
Continued ▶

◀ **Listing 3. Maze continued**

```
  950 DEF PROCH(S%,Z%)
  960 H%=512/Z%
  970 B%=614.4/Z%
  980 MOVE 640-B%,508+H%*S%
  990 DRAW 640+B%,508+H%*S%
 1000 ENDPROC
 1010 :
 1020 REM PERP'R
 1030 DEF PROCP(S%,T%,A%,Z%)
 1040 MOVE 640+614/A%*T%,508+5
12/A%*S%
 1050 DRAW 640+614/Z%*T%,508+5
12/Z%*S%
 1060 ENDPROC
 1070 :
 1080 REM SIDEWALL
 1090 DEF PROCW(S%,Z%)
 1100 IF (D% AND 5) GCOL 0,1+J
% MOD 7 ELSE GCOL 0,1+I% MOD 7
 1110 PROCV(S%,Z%,4)
 1120 PROCV(S%,Z%+1,85)
 1130 W%=W%+1
 1140 ENDPROC
 1150
 1160 REM ENDWALL
 1170 DEF PROCE(Z%)
 1180 IF FNC(K%,L%,16) PROCT(Z
%-1)
 1190 IF FNC(K%,L%,32) PROCU(Z
%-1)
 1200 IF (D% AND 5) GCOL 0,1+K
% MOD 7 ELSE GCOL 0,1+L% MOD 7
 1210 PROCV(1,Z%,4)
 1220 PROCV(-1,Z%,85)
 1230 IF Z%<>2 OR W%<2 OR FNC(
I%,J%,&80)<>0 OR FNC(I%,J%,16)
<>0:R%=0:ENDPROC
 1240 U=RND(-V%*37-I%*43-J%*19
)
 1250 VDU 5:MOVE 560,180:GCOL
0,7
 1260 R%=RND(7)
 1270 ON R% GOSUB 1290,1300,13
10,1320,1330,1340,1350
 1280 ENDPROC
 1290 PROCobj("ooo"):PRINT TAB
(7,3)"chain":RETURN
 1300 PROCobj("8 8"):PRINT TAB
(7,3)"coins":RETURN
 1310 PROCobj("+--"):PRINT TAB
(7,3)"dagger":RETURN
 1320 PROCobj(":.:"):PRINT TAB
(7,3)"jewels":RETURN
 1330 PROCobj("~~ "):PRINT TAB
(7,3)"pearls":RETURN
 1340 PROCobj("%% "):PRINT TAB
(7,3)"crown":RETURN
 1350 PROCobj("* *"):PRINT TAB
(7,3)"gold":RETURN
 1360 DEF PROCobj(A$)
 1370 PRINT A$;:PLOT 0,-160,-4
:PRINT A$
 1380 VDU 4:ENDPROC
 1390 :
 1400 REM DOOR
 1410 DEF PROCD(S%,Z%,F%)
 1420 IF Z%<2:ENDPROC
 1430 IF (D% AND 5) GCOL 0,1+K
% MOD 7 ELSE GCOL 0,1+L% MOD 7
 1440 IF F%<14 F%=10
 1450 H%=512/Z%
 1460 A%=640+H%*S%*1.2
 1470 B%=640+512/(Z%-F%/16)*S%
*1.2
 1480 MOVE A%,508-H%
 1490 MOVE B%,508-H%
 1500 PLOT 85,A%,508+H%
 1510 PLOT 85,B%,508+H%
 1520 ENDPROC
 1530 :
 1540 REM DOWN
 1550 DEF PROCT(Z%)
 1560 PROCH(-1,Z%)
 1570 PROCH(-1,Z%+1)
 1580 MOVE 640-614/Z%,508-512/
Z%
 1590 DRAW 640-614/(Z%+1),508-
512/(Z%+1)
 1600 DRAW 640-614/(Z%+1),508-
512/Z%
 1610 MOVE 640+614/Z%,508-512/
Z%
 1620 DRAW 640+614/(Z%+1),508-
512/(Z%+1)
 1630 DRAW 640+614/(Z%+1),508-
512/Z%
 1640 ENDPROC
 1650 :
 1660 REM UP
 1670 DEF PROCU(Z%)
 1680 PROCH(1,Z%):PROCH(1,Z%+1
)
 1690 MOVE 640-614/Z%,508+512/
Z%
 1700 DRAW 640-614/(Z%+1),508+
512/(Z%+1)
 1710 DRAW 640-614/(Z%+1),508+
512/Z%
 1720 MOVE 640+614/Z%,508+512/
Z%
 1730 DRAW 640+614/(Z%+1),508+
512/(Z%+1)
 1740 DRAW 640+614/(Z%+1),508+
512/Z%
 1750 ENDPROC
 1760 :
 1770 DEF PROCQ
 1780 CLS:GCOL 0,7
 1790 PRINT TAB(4,1)"LEVEL "V%
 1800 FOR X%=0 TO 15
 1810 FOR Y%=0 TO 15
 1820 IF FNC(X%,Y%,2)=0 MOVE 2
56+X%*48,128+Y%*48:DRAW 256+X%
*48+48,128+Y%*48
 1830 IF FNC(X%,Y%,1)=0 MOVE 2
56+X%*48,128+Y%*48:DRAW 256+X%
*48,128+Y%*48+48
 1840 NEXT:NEXT
 1850 MOVE 256,896:DRAW 1024,8
96:DRAW 1024,128
 1860 PROCwhere
 1870 ENDPROC
 1880 :
 1890 DEF PROCM
 1900 FOR A%=0 TO 15
 1910 FOR B%=0 TO 15
 1920 M%(A%,B%)=0
 1930 NEXT:NEXT
 1940 CLS:GCOL 0,7:A%=RND(-V%*
53)
 1950 PRINT TAB(4,1)"LEVEL "V%
 1960 FOR X%=0 TO 768 STEP 48
 1970 MOVE 256+X%,128
 1980 DRAW 256+X%,896
 1990 NEXT
 2000 FOR Y%=0 TO 768 STEP 48
 2010 MOVE 256,128+Y%
 2020 DRAW 1024,128+Y%
 2030 NEXT
 2040 N%=0
 2050 GCOL 0,0
 2060 A%=RND(14)
 2070 B%=RND(14)
 2080 F%=RND(6)*5
 2090 D%=(RND(2)*2-3)
 2100 E%=(RND(2)*2-3)
 2110 REPEAT
 2120 C%=0
 2130 IF RND(F%)=1 AND N% THEN
 2180
 2140 PROCN(D%,0)
 2150 PROCN(0,E%)
 2160 PROCN(-D%,0)
 2170 PROCN(0,-E%)
 2180 IF C%=0 PROCS:GOTO 2130
 2190 A%=K%:B%=L%
 2200 UNTIL N%>254
 2210 GCOL 0,3
 2220 Q%=0
 2230 FOR A%=0 TO 15
 2240 FOR B%=0 TO 15
 2250 Q%?&900=M%(A%,B%)
 2260 Q%=Q%+1
 2270 NEXT:NEXT
 2280 VDU 5
 2290 IF V% MOD 2:?&900=?&900
OR 16:?&90F=?&90F OR 32:ENDPRO
C
 2300 ?&90F=?&90F OR 16
 2310 ?&900=?&900 OR 32
 2320 PROCwhere
 2330 ENDPROC
 2340 :
 2350 DEF PROCwhere:VDU 5
 2360 MOVE 250+I%*48,168+J%*48
 2370 IF D%=1 PRINT "<"
 2380 IF D%=2 PRINT "v"
 2390 IF D%=4 PRINT ">"
 2400 IF D%=8 PRINT "^"
 2410 MOVE 264,168
 2420 IF V% MOD 2 PRINT "d" EL
SE PRINT "u"
 2430 MOVE 264,888
 2440 IF V% MOD 2 PRINT "u" EL
SE PRINT "d"
 2450 *FX 15
 2460 U=GET:VDU 4:ENDPROC
 2470 :
 2480 DEF PROCN(G%,H%)
 2490 IF C% ENDPROC
 2500 K%=A%+G%:L%=B%+H%
 2510 IF K%<0 OR K%>15 OR L%<0
 OR L%>15 ENDPROC
 2520 IF M%(K%,L%) ENDPROC
 2530 N%=N%+1
 2540 C%=TRUE
 2550 IF K%<A% PROCG(0,4,0,47)
:M%(A%,B%)=M%(A%,B%) OR 1:M%(K
%,L%)=M%(K%,L%) OR 4:ENDPROC
 2560 IF K%>A% PROCG(48,4,48,4
7):M%(A%,B%)=M%(A%,B%) OR 4:M%
(K%,L%)=M%(K%,L%) OR 1:ENDPROC
 2570 IF L%<B% PROCG(8,0,47,0)
:M%(A%,B%)=M%(A%,B%) OR 2:M%(K
%,L%)=M%(K%,L%) OR 8:ENDPROC
 2580 IF L%>B% PROCG(8,48,47,4
8):M%(A%,B%)=M%(A%,B%) OR 8:M%
(K%,L%)=M%(K%,L%) OR 2
 2590 ENDPROC
 2600 :
 2610 DEF PROCS
 2620 REPEAT
 2630 A%=RND(16)-1:B%=RND(16)-
1
 2640 UNTIL M%(A%,B%)<>0
 2650 ENDPROC
 2660 :
 2670 DEF PROCG(P%,Q%,R%,S%)
 2680 X%=256+A%*48:Y%=128+B%*4
8
 2690 MOVE X%+P%,Y%+Q%:DRAW X%
+R%,Y%+S%
 2700 ENDPROC
```

OFFERS

THIS MONTH'S LISTINGS



We have put together many utilities to help get your 1989 computing off to a good start. Included in Hints and Tips this month are: a fade to black routine which protects the monitor automatically while the keyboard is not being used; a one-line function procedure lister; a utility to provide a word wrap on *Interword;* and a file back-up for *Wordwise Plus.*

Agora features programs that explain the sound system on the Arc including converting samples into modules. There is also a disc sector copier and a Master to Arc font converter.

Joe Telford has come up with a *User Card* to rival Apple's *Hypercard.* There are also all sorts of digitised pictures. The monthly discs are available in 3.5-inch and 5.25-inch versions, please see page 115 to place your order.

See in 1989 with the January's listing disc

GAMES DISC

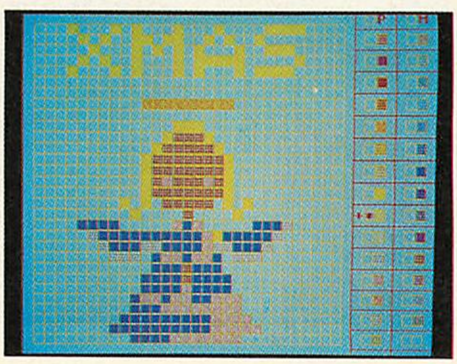
Ten of the best *Acorn User* games on one 80-track double-sided 5.25-inch disc.

Whether you're into arcade or adventure type games this new disc has something for everyone. The games included are *Warlord, Wizalon, Castle of Nightmares, Run Silent, Run Deep, Polyominoes* and *Quadline.* We have also included three of the most popular one-line games from recent Abusers. Test your knowledge with *Mastermind* and start playing *Varpon* and *Lurch* to win. Make sure you get your disc of fun and entertainment and send off for the Games disc today. At only £8.95 it will make the perfect Christmas gift.

Games galore for just £8.95



'87 COMPILATION DISC



Acorn User has put all your favourite programs, routines and utilities from 1987 on one disc.

Featured are: Kiddie Art; Tapestry; PCB by CAD; Autumn and Theme, our music programs from April '87. Also on the disc is Joe Telford's GEM-like front end for the Master including a desktop calendar and year planner.

Other useful utilities include a proportional screen dump, a *View* printer driver generator, a monitor-testing routine and a routine for printing spreadsheets sideways.

The second half of the disc is devoted to graphics, with a video image enhancer and six of the best Graphics Bonuses.

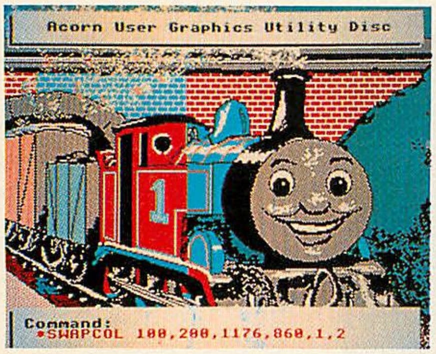
The *Acorn User* '87 Compilation disc comes in 5.25-inch 80-track format, with a comprehensive manual which includes all function key strips and instructions needed for the programs.

All the very best of '87 on one disc

ORDER BY TELEPHONE (0672) 40825

OFFERS

SOFTWARE & GRAPHICS



Great graphics utilities

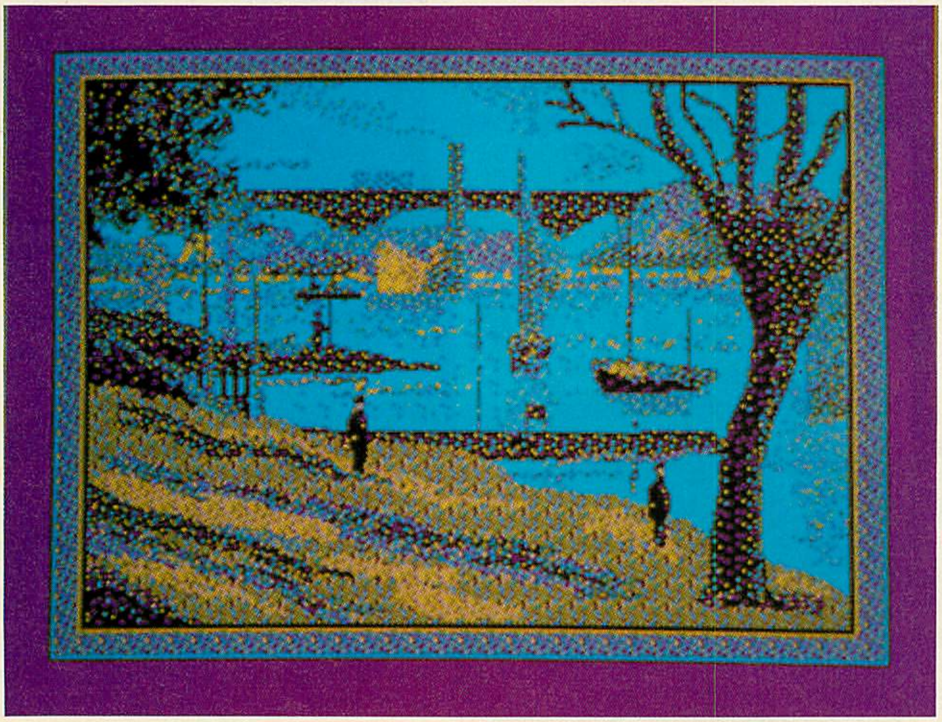
The 40-track 5.25-inch *Graphics Utilities* disc, keenly priced at £7.95, features 16 stand-alone machine code utilities, an advanced teletext editor, several useful Basic procedures, an easy-to-adapt disc header and index. Included are: *ROTATE, rotates area through 180 degrees; *SWAPCOL, swaps two colours; *COLFILL, a colour fill routine; *SVPIC, saves a compacted picture; *LDPIC, reloads a compacted picture. There are many utilities to manipulate graphics.



Sideways RAM made simple

The *Acorn User* sideways RAM disc gives you many more utilities for your sideways RAM. These include: RAMpad – your computer's answer to the pad and pen; six different on-screen fonts available in all modes; a 15k printer buffer; Screen Swap – store and recall mode 4 or 5 screens; *ROMHEAD – standard service ROM header; *RLOOK – allows you to examine sideways RAM or ROM.

There are many more utilities on this 40/80-track 5.25-inch disc and it's a snip at £9.95.



Micro masterpieces on Portfolio for £9.95

Jonathan Inglis, freelance illustrator, has assembled a *Portfolio* of his best work exclusively for *Acorn User*.

The disc contains screens that have been used by national and regional publications. Included are Seurat's *Bathers*, a *Time Out* cover from August 1985, and two familiar *Acorn User* covers, Willow (Nov '86) and Magician (Jan '86), as well as several pictures commissioned by *The Times*.

Three of Jonathan's favourite masterpieces are on the disc; Seurat's *Riverside*, Vermeer's *Lady at the Virginal* and a copy of a famous lithograph by Matisse. Sade fans will probably be more interested in the two stunning portraits of the singer included on the disc.

You can create your own *pièce de résistance* using the Pixel Editor and Super Painter programs. Pixel Editor allows you to draw in and alter minute detail, while Super Painter enables you to draw lines, texture your screen and shade by mixing the eight standard colours.

Portfolio comes in 80-track 5.25-inch format with a comprehensive instruction sheet telling you about the pictures and how the artist created them. This disc can be yours for only £9.95.

TO ORDER USE THE FORM ON PAGE 116

ORDER FORM

5.25-INCH DISC SUBSCRIPTIONS

Yes! Please start my 5.25-inch disc subscription with the ______ issue.

01	UK	☐	£40.00
02	UK (with *BBC Acorn User* magazine)	☐	£50.00
03	EUROPE (Airmail)	☐	£76.00
03	OVERSEAS (Surface)	☐	£76.00
04	OVERSEAS (Airmail)	☐	£84.00

TOTAL VALUE £______

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- ☐ MAR 0218-6
- ☐ APR 0219-4
- ☐ MAY 0220-8
- ☐ JUL 0222-4
- ☐ SEP 0224-0
- ☐ NOV 0226-7
- ☐ DEC 0227-5

1988
- ☐ JAN 0228-3
- ☐ FEB 0229-1
- ☐ MAR 0230-5
- ☐ APR 0231-3
- ☐ MAY 0232-1
- ☐ JUN 0233-X
- ☐ JUL 0234-8
- ☐ AUG 0235-6
- ☐ SEPT 0236-4
- ☐ OCT 0237-2
- ☐ NOV 0238-0
- ☐ DEC 0239-9

1989
- ☐ JAN 0240-2

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02	EUROPE (Airmail)	☐	£76.00
02	OVERSEAS (Surface)	☐	£76.00
03	OVERSEAS (Airmail)	☐	£84.00

TOTAL VALUE £______

3.5-INCH MONTHLY DISCS

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- ☐ SEPTEMBER 0502-9
- ☐ OCTOBER 0503-7
- ☐ NOVEMBER 0504-5
- ☐ DECEMBER 0505-3

1989
- ☐ JANUARY 0506-1

Monthly 3.5-inch discs are suitable for the Master Compact and the Archimedes.

UK = £6.95
Europe = £7.95
Overseas = £8.95

TOTAL VALUE £______

MAGAZINE SUBSCRIPTIONS

Yes! Please start my subscription with the ______ issue.
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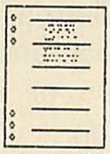
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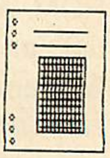
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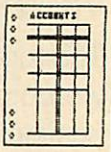
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FAX PACK basically allows any document, be it printed text or graphics, or an electronic document such as a word processor file, to be sent to FAX machines anywhere in the world, in seconds. This is done by scanning (digitising) the document and then sending it digitally over a normal phone line to the receiving FAX machine which re-constructs the image and then prints it.

THE HARDWARE

The basic FAX PACK consists of a modem podule that plugs into any Archimedes computer, and the software to drive it. A variety of options are available such as scanners and power switching boxes.

The podule has connections for a scanner and power switching box (see below) and a conventional telephone line. An adapter is provided allowing a conventional phone to be paralleled with FAX PACK so that only one telephone line is required for both FAX and conventional use. However if a lot of FAX mail is going to be sent/received then a separate dedicated line is advisable.



Scanner & Sheet Feeder

Unlike many normal FAX machines the hardware also provides both auto-answer and auto-dial facilities making it convenient and allowing completely automatic operation without human intervention.

THE SOFTWARE

As part of FAX PACK this not only provides all the basic mechanisms for communicating with FAX machines but also includes high level WIMP based facilities for viewing FAXes on screen within a window, where they can be pixel edited, scaled, cropped,printed, etc.

This WIMP based software is simplicity itself to use so FAX PACK can be used in the office by staff with little or no computer experience. Of course unlike any conventional FAX machine FAXes can be viewed on screen, or filed away on disc for future reference without ever getting onto paper.

The software also allows text, word processed files, even graphics, to be automatically converted to a suitable FAX format for sending to other FAX machines. The paperless office becomes closer to reality since it is now possible to write articles, documents or letters and then send these directly to remote machines without involving paper.

However facilities are also included for printing FAXes to a range of 9 and 24 pin dot matrix, inkjet and laser printers.

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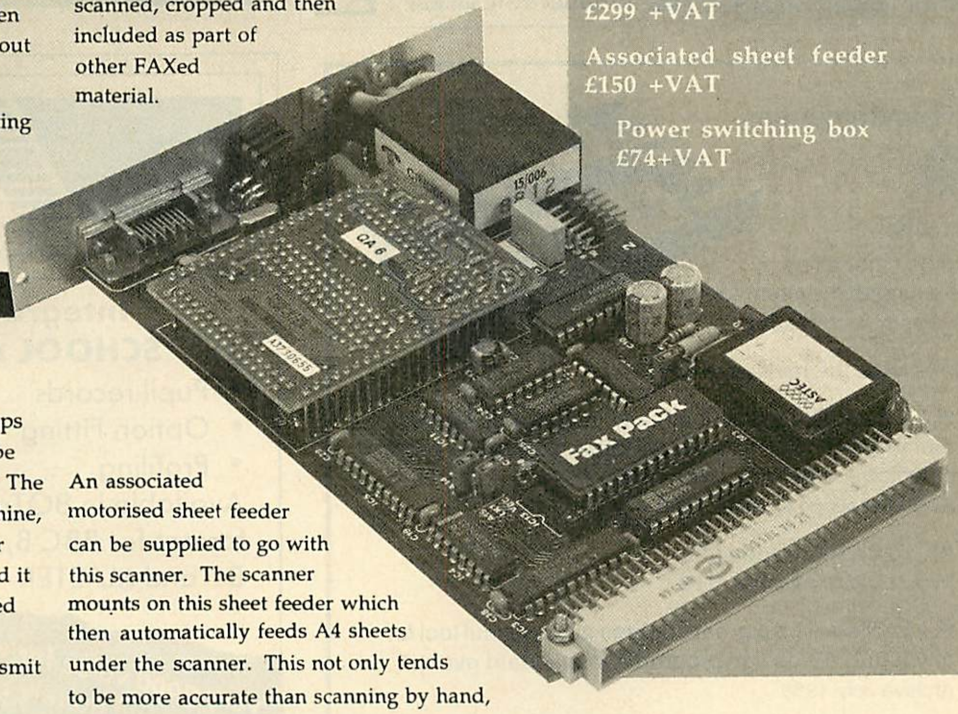
The FAX podule actually consists of a 9600 bps auto-answer, auto-dial modem, and so can be used for much more than just FAX transfer. The software can detect the type of remote machine, and if it finds a similarly equipped computer (rather than a FAX machine) at the other end it can then transfer ANY file fully error checked and glitch free. And by using some very advanced transmission protocols it can transmit data 4 times faster than most conventional modems on normal telephone lines.

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In order to send printed material it is necessary to digitise the page. An optional hand-held, A4 width, 200 dpi scanner can connect to the FAX podule. Being hand-held it is not only supremely compact, but it can digitise complete A4 pages, or pages from books or other awkward shaped documents.



Of course images scanned in this fashion are not only useful for FAX purposes but also for inclusion in word processor or desk top publishing programs. FAX PACK software allows company logos and signatures to be scanned, cropped and then included as part of other FAXed material.



An associated motorised sheet feeder can be supplied to go with this scanner. The scanner mounts on this sheet feeder which then automatically feeds A4 sheets under the scanner. This not only tends to be more accurate than scanning by hand, but is also more convenient.

AUTOMATIC POWER SWITCH

This external power switching box can automatically switch the computer on in order to answer incoming FAXes. The FAX podule can then answer the phone, receive the FAX and file it to disc, and then switch the computer off again. The computer can therefore be switched off and left completely unattended for very long periods of time.

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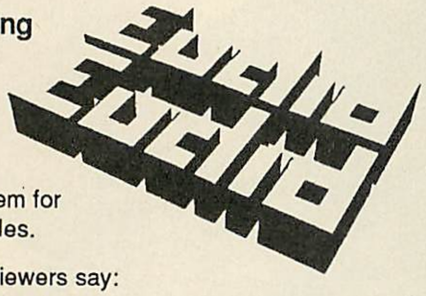
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REVIEWS

THE GAMES PAGE

FIGHTING FUN

Sam Greenhill surveys the best and the rest of games to get hooked on

Over the past year there have been fewer games on the BBC and Electron market than in previous years, but software houses have made up for this by adding quality to their products. One of the reasons could be the advent of the Archimedes – a number of companies, notably Minerva, have pulled out all their resources to produce software for the 32-bit machine, and have rather neglected the Beeb.

There were only about 30 games that I considered for nomination, not enough I thought, for a real Top Ten. I decided to narrow the field down to just five of my favourite 1988 games. There is a very small pool of BBC games that I've been unable to get my hands on for previewing in this column, so they don't stand a chance of being nominated for the Top Five, any more than the games that appear after my deadline, though these will be reviewed next year.

In addition to my Top Five, I've compiled a Top Three award to cater for Archimedes owners, but more about this later....

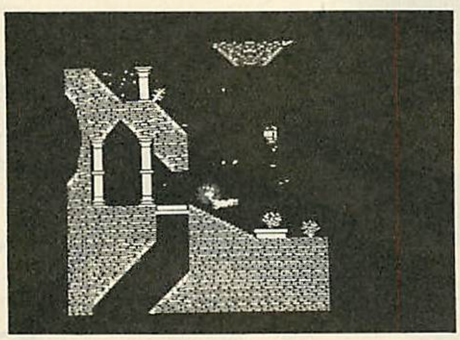
THE TOP FIVE

1. Exile; Superior software
Graphics: ★★★★
Addictiveness: ★★★★
Value for money: ★★★★★

It pains me to consider the complexities involved in writing a game such as superior's *Exile,* but I can assure you the results are definitely worth it. Ever since I got my copy I've been inventing excuses to play it, and this includes a theory that sleep isn't necessary.

Set in the future, you are returning from a mission when your spaceship receives a distress call from the planet Phoebus. A party of travellers have been abducted by the evil professor Triax. In addition to rescuing the stricken crew, you must also find supplies for your own ship, and deal with many futuristic pests – all in a vast underground labyrinth.

This game outsmarts all others for this year and I recommend you get it soon, especially if you have a Master or a BBC with some sideways RAM.



2. Tetris; Mirrorsoft
Graphics: ★
Addictiveness: ★★★★★
Value for money: ★★★★

Although the graphics and sound of this game wouldn't be enough to make you look twice, only a few goes and you're hooked. The object? Fit falling shapes exactly into a block without producing any holes. A game of simplicity, but very addictive. It also represents some sort of milestone in *glasnost,* as it was originally coded in the Soviet Union, and only converted over here by Mirrorsoft.

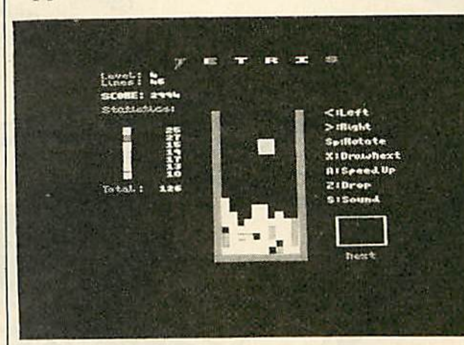
Tetris is a perfect example of how a game can be good on an addiction factor alone, despite poor graphics and sound.

3. Icarus; Mandarin
Graphics: ★★★
Addictiveness: ★★★★
Value for money: ★★★

Icarus is Mandarin's first attempt, although originally programmed by Powerhouse, and it's a good one. Battle through 20 decks to reach the ship's computer — and on the way shoot the lifts disgorging killer droids. Nothing particularly new here, but when added to the facility for two players to work together, again in itself nothing new, the combination works well and a good game is produced. The only thing that seems to be missing is a screen designer. Also look out for Mandarin's Level 9 adventures; they're good, especially the latest, *Lancelot.*

4. Empire Strikes Back; Domark
Graphics: ★★★
Addictiveness: ★★★★
Value for money: ★★★

Just like the film, the Empire is not defeated by the destruction of the Death Star, and returns to seek revenge. If you've seen the film, there's not much to describe. If you haven't then you should have – I haven't got enough room here! However I can tell you that it is a worthy enough sequel to *Star Wars.* But the bad news is that Domark's part three, *Return of the Jedi,* will not be making an appearance on an Acorn machine.



5. Pipeline; Superior Software
Graphics: ★★★★
Addictiveness: ★★★
Value for money: ★★★★

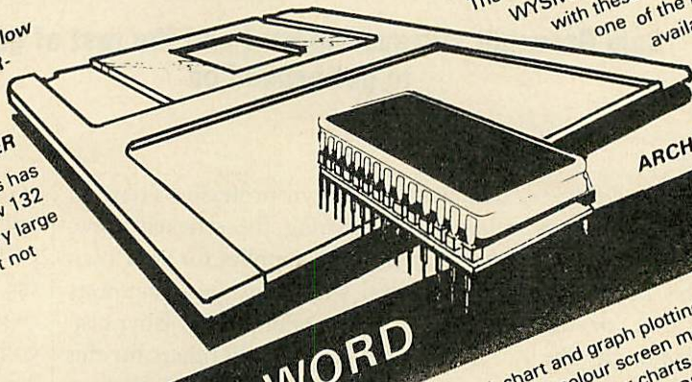
This is Superior's second title in the chart, and it's the sequel to *Ravenskull* (which incidentally came fifth last year!). *Pipeline* was written by two 15-year-olds

Software for the Archimedes now available on disc...

Computer Concepts is now releasing new low cost DISC versions of its popular INTER-products for the Archimedes.
WORD, SHEET, CHART and SPELL-MASTER

Inter-Word has now sold over 30,000 copies, making it one of the most popular products ever released for the BBC. The Archimedes version has several improvements including support for colour, and for the 132 column and 64 line screen modes allowing almost a complete page to be seen on screen at once. The existing features, such as auto formatting, WYSIWYG display and super fast scrolling together with these new enhancements ensure this is still one of the most effective word processors available for the Archimedes.

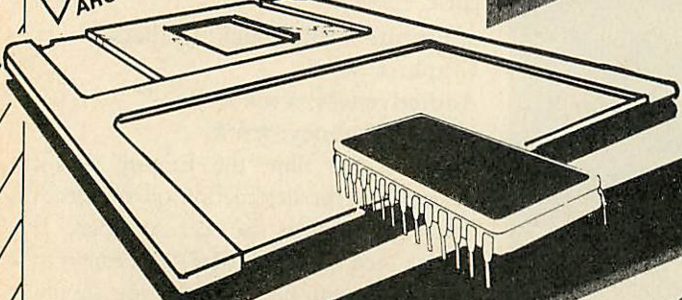
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INTER-WORD

A simple to use but powerful spreadsheet. This has also been altered to take advantage of the new 132 column and 64 line screen modes allowing very large sheets to be viewed on screen. Easy to use but not lacking in facilities.

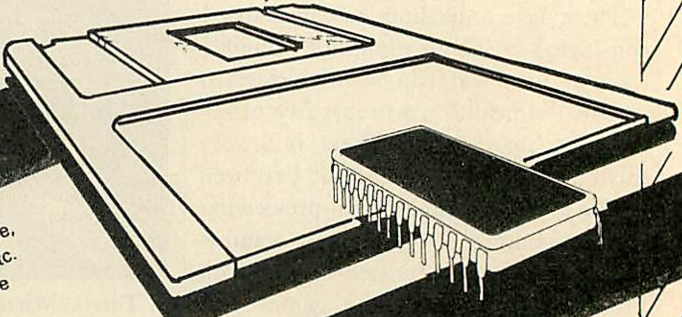
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A chart and graph plotting program, now supporting the 256 colour screen modes which can produce impressive colour charts and graphs. An ideal complement for INTER-SHEET, although it can plot graphs from practically any data.

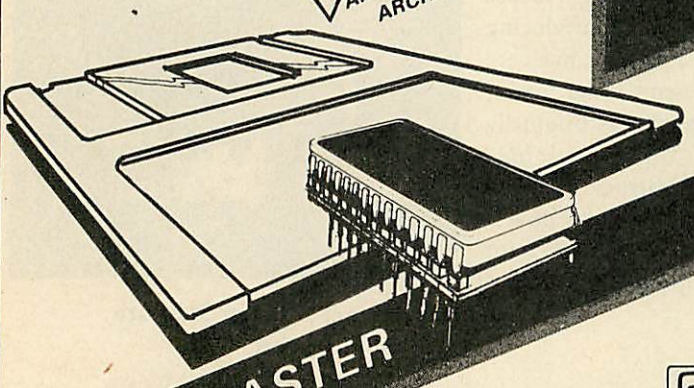
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An ideal partner for INTER-WORD. Check as you type, new intelligent guess routines, crossword solving etc. This is a native ARM product, and does not need the 6502 emulator.

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SPELL-MASTER

The INTER products run under the 6502 emulator but with some enhancements and other changes to suit the Archimedes. They are all compatible with the BBC versions and can load BBC files with no changes. No ROM-LINK facilities are available.

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REVIEWS

THE GAMES PAGE

and the idea is to collect 'collectables' while dodging through a maze of pipes and monsters. It's a good game because of the ability to design practically everything yourself.

ARCHIMEDES TOP THREE



***1.* Zarch; Superior Software**
Graphics: ★★★★★
Addictiveness: ★★★★★
Value for money: ★★★★★

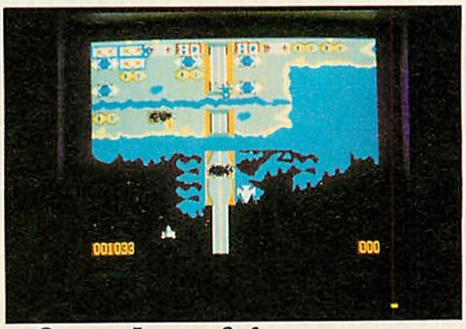
It is unusual for the first game on a new machine to be good, never mind come first, but I still think *Zarch* is the best game available for the Arc to date. There isn't much to describe – anyone with an Archimedes will already have *Lander,* but *Zarch* takes a good thing further and if you haven't already bought this game then make a point of doing so. Although the game doesn't 'develop' much after your first flight, it is still great fun. It has also been ported onto the Atari ST, and (laughably) the Spectrum. Arc owners will be cheered to know they have the best version.



***2.* Terramex; Grand Slam**
Graphics: ★★★★★
Addictiveness: ★★★★
Value for money: ★★★★★

Terramex is Grand Slam's first game for an Acorn machine, and it's a particularly good debut. You are one of five explorers on the trail of Professor Eyestrain who, to cut a long story short, is the only one who can save the world. Set in a weird and wacky world of funny creatures and excellent graphics, the game is highly amusing and very playable. Another good feature is the stereo backing – easily the best sound on the Archimedes yet.

A good arcade-adventure.



***3.* Quazer; Impact Software**
Graphics: ★★★★
Addictiveness: ★★★
Value for money: ★★★★

Although there are two *Uridium* clones out for the Arc, *Alerion* by Dabs Press and *Quazer* from Impact Software, they are virtually identical and so almost came joint third. Due to *Quazer's* slightly lower price, I've chosen it to collect the honours. The idea is to fly over a landscape plastered with gun stations, destroying various targets while shooting interceptor aircraft. With some slight variations, the games are very similar and very addictive.

I think I slightly prefer the graphics in *Alerion,* and the idea of flying over a 'homebase' to allocate a fall-back position should you die struck me as very novel.

But on the other hand, *Quazer* has a catchy tune and only one fire button!

Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX.
Mirrorsoft, 66-73 Shoe Lane, London EC4P 4AB.
Mandarin, Europa Hse, Adlington Park, London Road, Adlington, Macclesfield, Cheshire.
Domark, Domark House, 22 Hartfield Road, London SW19 3TA.
Grand Slam, 12-18 Paul Street, London EC2 4JS.
Impact Software, Neepsend House, 1 Percy Street, Sheffield S3 8AU.

And now for some miscellaneous comments. Tynesoft receives a prize for it's vast numbers of fun simulations, especially for the lion-taming in *Circus Games.* Unfortunately I haven't been able to get hold of a copy yet, likewise for *Superman,* its other game. But you never know, either of them could have been my number one!

Minerva gets an award for producing the greatest number of Archimedes games – not one of them made it into the Top Three, although *Orion* was very close and the latest, *Jetfighter,* wasn't ready before my deadline. Actually, Minerva gets two prizes, its second one being for the most absurd idea for a game ever invented; *Freddy Phrogg,* come on down! (See page 129).

If Superior can look up from its compiling for a few seconds, then it'll see that it has received a prize for its series of *Play it Again Sam*'s. At present it's stalled at *Play it Again Sam 6* (or is it 7?), but by the time this article comes out I estimate the figure to be somewhere around the 26 mark.

Sam was said to be too busy to be present at the ceremony.

I've had some new *Revs* times sent in to me that beat L Surguy's records! Unfortunately I've managed to misplace them. Could whoever sent them bear to give me another copy?

On the subject of *Revs,* I've had a letter from a Barnes Cook all the way from America who claims to have a Brands Hatch time of 1:21.3, that's 2.4 seconds faster than the current record. Barnes says he has a Beeb and was sent a copy of September's *Acorn User* by a friend in which I made a plea for faster *Revs* times.

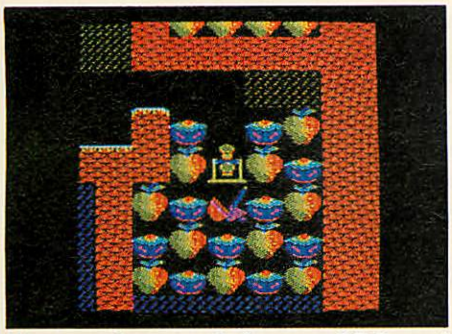
The main news in the games world this month is a new *Repton. Repton Infinity* is a complex games designer, that you can use to build up your own games: *Repton, Ravenskull, Pengo, Pipeline,* possibly even *Space Invaders* and a spreadsheet – they are all possible. It comes with three example games, and you can compile any number of new versions. It should be out mid-November.

Next month's Games Page will be back to normal, but this doesn't give you an excuse to miss it!

REVIEWS

GAMES

MOON WALKING



Clogger; Impact Software, BBC and Electron cassette £4.95, 5.25-inch disc, £4.99, or 3.5-inch disc, £6.99

Clogger is Impact Software's third game and carries with it a strange and mysterious story-line. The curious Clogger is a type of creature with three feet and no head, as depicted on the flag of the Isle of Man.

The Cloggers have a great love for art, and juvenile cloggers must prove their artistic appreciation by undertaking a series of tests. The tests come in the form of levels not at all dissimilar to the *Repton* series – 18 landscapes in three files of six. Each level has a map like *Repton* and in each the Clogger must collect pieces of a painting, which it uses at the end to build up a picture.

The bad news is that there's a time limit, and the good news is that pneumatic drills are on offer – useful for a stubborn brick wall. There are also springs, lawnmowers and 'rebounding gyroscopes' to deal with. I know the games scene is getting conventional, but this is ridiculous!

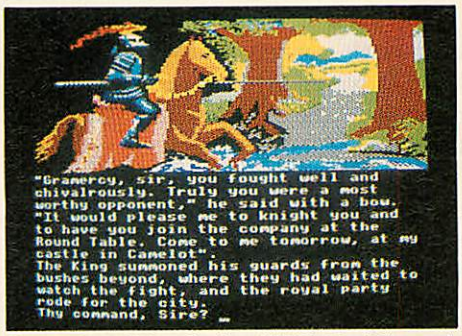
Compatibility was a problem, and I only got the game working on the third Beeb I tried it on – removing most of the ROMs. In play the game is virtually indentical to *Repton.* Cloggin' along and pushing around puzzle pieces is the long and the short of it, but nibbling at cakes and fruit and mowing the deadly grass do liven things up slightly.

The characters are of only average graphical quality, but the animation passes without fault. Maps are available, and there is also an enlarged picture of the painting your Clogger has to produce.

Despite an amusing scenario, *Clogger* is just a three-legged *Repton.* Although it's less than £10, I can't recommend this very strongly.

Sam Greenhill

MEDIEVAL QUEST



Lancelot; Mandarin, BBC B, B+ and Master, 5.25-inch disc, £14.95

Can you complete the quest for the Holy Grail? That's the question being asked in Level 9's latest release, *Lancelot,* available through Mandarin.

You play the leading knight of King Arthur's Round Table, Lancelot, whose ultimate goal is to retrieve the Holy Grail. The game is played in three parts; Camelot, Logris and The Quest for the Holy Grail. I managed to complete the first part with difficulty but didn't do particularly well on the other two.

Lancelot has a medieval atmosphere which is enhanced by being written in 'ye Olde English' – which you'll either find fun or intensely annoying. Either way it's easy enough to understand. The instruction booklet describes the game well and includes a shortened version of Sir Thomas Malory's 'Morte d'Arthur'. I suggest you read the instructions carefully, even if you're a regular Level 9 fan.

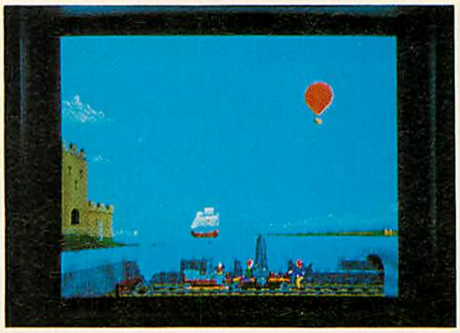
Lancelot has some good features, including an undo command which retraces your last instruction. When you run the game you get a choice of where to start, but first-timers should begin with the Camelot section.

I like this game purely for the text. The graphics are reasonable but should have been better. The colouring of the graphics isn't very good, but the BBC's limitations are to blame.

Lancelot is to the usual high standard of Level 9.

Michael Barnes

CASTLES AND CANNONS



Freddy's Folly; Minerva, Archimedes, 3.5-inch disc, £14.95

Freddy's Folly is one of the latest from the Minerva Archimedes games department. In *Freddy,* you own one of two castles that are separated by a narrow sea. The other is owned by Sir Freddy Phrogg, who is jealous of your palatial dwelling and intends to destroy it. To thwart the attack – made in hot-air balloons – you have a single cannon mounted on a cart and a three-person crew. But Freddy has pre-empted this and employed several gun-ships, each of which has a go at defacing your battlements. The ships have far more cannons than you do and I fail to understand why they don't all concentrate their efforts on your castle – they'd succeed!

The game uses detailed and picturesque sprites throughout, which are very smartly animated. Not only is the entire framework of the game amusing, but there are many little quirks added too. For example, one of the gunships blew a hole in my cannon's track and, being the clever player I am, I pushed the cannon down the hole. One of the operators fell down with it, so the other two came over and helped him up again!

At the end of the game a statistic chart is displayed, and the cannon is rolled off while one of the operators juggles with cannon balls. Good fun, but it took me no longer than 15 minutes to sink all the ships and destroy the balloons. Left with nothing to do, I turned off my Arc and walked away. The game is too simple.

Freddy's Folly is graphically impressive, the sound is good, and the game is highly amusing, but I'm afraid that's all.

Sam Greenhill

REVIEWS

GAMES

IT'S A YUPPIE'S LIFE



Corruption; Rainbird, Archimedes, 3.5.inch disc, £24.95.

A couple of years ago, Rainbird released a game that was to change the face of adventure games. *The Pawn* was regarded by many as the definitive graphical adventure. Versions were released for virtually all the computers around at the time, except the humble BBC. Now that Acorn has ventured into the 32-bit market Arc owners can at last experience the delights of Magnetic Scrolls' adventures like *The Pawn.*

Unlike the swords and sorcery-soaked plots of previous games *Corruption* is set in the bang-up-to-date City of London. You begin as a new partner in a firm of stockbrokers, and have to fight hard to keep your head above the financial water.

The game is littered throughout with the lifestyle trappings of the yuppie, from the CD player in your partner's office, through to the Porsches and BMWs in the underground car-park.

The packaging is of the high-quality expected of Rainbird and even that has not escaped 'yuppification'. All the instructions are printed on 6-hole 'filofax-type' paper. A cassette of the *Corruption* music, plus a doctored interview featuring 'yours truly', is included.

Unlike most other adventures, there is no ultimate quest, although staying alive could be regarded as important. Points are awarded for carrying out tasks and overcoming problems. Like other games, these often have to be carried out in the correct order, and to make it really hard, all at the right time. Every move you make counts as one minute, so think before you act. With luck, there are many other people to meet on your travels – be kind to the Tramp, and whatever you do, don't let Nurse Stephenson catch you creeping about!

This has to be one of the best games I've ever played. For someone weaned on text-only 'classics' as *Philosopher's Quest* and *Snowball, Corruption* seems to have everything that I've ever wanted in an adventure game. With excellent pictures to illustrate the locations and a command parser that understands even complex sentences, *Corruption* gets top marks in my view. Well done Rainbird! Now let's have *The Pawn, The Guild of Thieves* and *Jinxter* to complete the set.

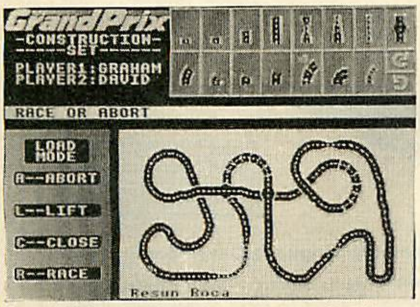
Robert Miller

COMING TOGETHER

One way of getting more mileage out of old games is becoming increasingly popular among the software houses – issue them as compilations and market the new package as value for money.

But are they? *Acorn User* invited three games enthusiasts to assess some of the latest offerings. Sam Greenhill wrestled with Mastertronic's *Megaplay,* while Mark Elmer and Paul Thornton explored *Play it again Sam,* Parts 3 and 4.

Mastertronic is one of the few companies in the BBC market which refuses to move with the times. To be fair, this is a compilation of some very old games, written in the days when almost any game was a winner. The package,



Grand Prix: create your own race track

apparently only available on tape, comprises six of the most boring games it has ever been my misfortune to review.

The first is *Galactic Patrol* and provides a simple exercise in destroying aliens. Next is *Vegas,* which presumably means it involves gambling of some kind. But it failed to load, so I shall never know.

The Way of the Exploding Fist is the best game on the tape. A standard martial arts game, with a complex set of keys to press. Sadly they aren't redefinable. But the game is bearable and a two-player option is available.

Eddie Kidd is the worst of the lot – a creative use of boredom. The idea is to jump over various obstacles on your motorbike. However, the run-up takes almost a minute: you are treated to trees and fences drifting by while the white lines on the road zoom past at an astonishing speed. When at last I was woken by ramming into barrels, I realised that I had missed my chance to jump.

Geoff Capes's Martech strongman challenge makes an appearance too, but all I managed to succeed in doing with my newfound muscles was dropping a car onto my badly drawn figure's head – thus squashing myself flat. Finally, *Kane* 'entertained' me with atrocious music, pointless graphics and a boring challenge.

Most compilation reviews end with the words 'represents great value for money'. But not Mastertronic's collection, I doubt if any discerning games fiend would want to buy it. **SG**

The *Play it again Sam 3* package follows tradition and consists of four games, *Commando, Palace of Magic, Killer Gorilla* and its sequel *Killer Gorilla 2.*

Commando has a strong challenge – shoot enemy soldiers without getting wounded while battling through to a fortress, armed only with a machine gun and six grenades.

Palace of Magic has been described as *Citadel Part 2,* as the challenge in both is to find and activate the Transporter. You have been reduced to a dwarf by the evil wizard Caldeti. He has left you in one of his old homes, the eponymous palace. Your life depends upon energy that quickly runs out but is restored by collecting top hats.

Killer Gorilla was a classic: MicroPower's answer to the then popular Donkey Kong arcade game. The idea is to avoid the barrels, bowls of custard and 'springy things', scattered across the scaffolding, while rescuing your beloved from the clutches of the gorilla.

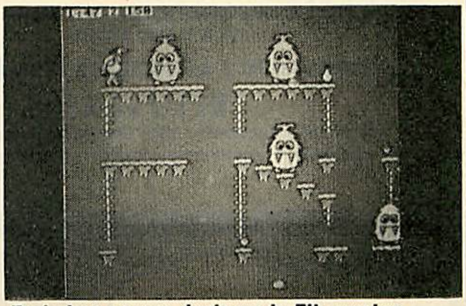
Killer Gorilla 2 is Superior's own sequel and involves rescuing the kidnapped monkey who has been locked up in a steel cage. This time you are in the shoes of Killer Gorilla himself, and being about six shoe-sizes too big this causes problems in manoeuvrability. The worst part is the music, but it can be silenced.

Overall, the compilation is a good one, and although a couple of the games are looking a bit dated, the package is held up by two very good titles. **ME**

Take three old games, plus one from Aardvark and one from Alligata, mix well: the result is Superior's *Play it again Sam 4.* There's *Spellbinder, Grand Prix Construction Set* (BBC only), *Frak, Guardian* (for Electron only) and the new release *Cosmic Camouflage.* The Electron fares well, with a screen designer for *Frak* – something that would have been good to have on the BBC version – and *Guardian,* a sort of *Defender.*

Superior describes the completely new game *Cosmic Camouflage* as '...An exciting, new sequel to *Meteors,* with many novel, advanced features ...' Most of the new features are aimed against the player! The game involves shooting rocks and the occasional spacecraft.

To add to the problems, just as you get used to moving about effectively, gravity takes effect, weakly at first, but becoming fairly strong in the later stages



Frak: has screen designer in Elk version

of the game. Manoeuvring in the strong gravity takes some getting used to, but I found it easy after a few games.

You gain one very useful trick – the camouflage cover. This is extremely useful, as when you cannot be seen you cannot be homed in on. The cover, warp drive and 'smart' bombs can be replenished by little canisters that are released when certain types of craft are hit – essential if you wish to stay alive.

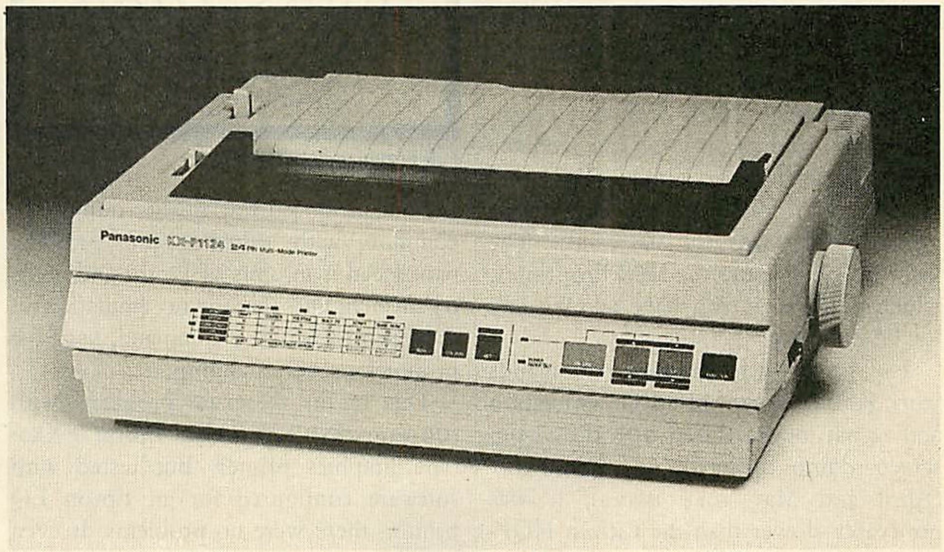
I'd recommend *Play it again Sam 4* to anyone who has not already bought the games on it. **PT**

Superior's tactic of mixing old and new – and other company's games – gave it the edge in this consumer test. Certainly *Play it again Sam 4* won the most enthusiastic response of all, whereas Mastertronic won nothing but a ripe raspberry for repackaging the prehistoric in games software.

Megaplay *by Mastertronics, available from Virgin Publishing, tape only £9.99.* Play it again Sam, 3 and 4 *are available on cassette, £9.95, 5.25-inch disc, £11.95, and 3.5-inch disc, £14.95.*

WORTHY PRINTER

The last Panasonic 24-pin printer we reviewed was a disappointment but the KX-P1124 is very good value, as Graham Bell discovered



The rather noisy KX-P1124 scores on print quality and software compatibility

The first Panasonic 24-pin printer *Acorn User* reviewed, the KX-P1540 (in August 1988), didn't find particular favour. Although it was the only wide-carriage model reviewed and had good paper handling, it suffered from poorer print quality than the competition.

Its newest model, the KX-P1124, seeks to redress this. It looks good, cool and business-like, and seems to be built well. The mouldings are substantial and a greater proportion of the mechanical parts are metal than with many printers.

Putting the printer together is simple once you've found somewhere to put it, for this printer is considerably bigger than previously reviewed Epson and Star models. However, this means it is big enough to take A3 paper, which the Star LC24-10 and Epson LQ500 cannot do. The usual parallel cable is used to connect to the Beeb or Arc, but you can get a serial interface as an option.

The tractor feed can pull or push, and paper can be fed from the rear or from the front through a slot. This turns out to be ideal for feeding in sheets of letterhead or even envelopes – difficult on the Epson LQ models.

Fitting the cartridge ribbon is really easy, and like other Panasonic cartridges, it can be re-inked by pushing a button on the cartridge. This should reduce your ribbon costs.

But getting the printer to work with your micro is a little more difficult. There's a comprehensive front panel which allows you to set up all manner of font, pitch and paper combinations; there's also three 'macro' settings which store complete combinations.

I couldn't get the macro settings to work without some help from Panasonic. This was due to an error in the draft manual which is being amended. The intention is that you store commonly used printer settings – condensed Courier for printing spreadsheets, a proportionally spaced font for letters and so on. But you can't use the macros to change between Epson and IBM emulation, which was what I wanted to do.

9-pin quality
Draft
Bold PS
Sans serif
Courier
Prestige
Script
Double
Laser quality

Draft to double shows range of built-in fonts

You have to go into a special mode to alter the initial set up conditions – the software equivalent of DIP switches. The manual suffers from a lack of clarity here. The special mode allows you to set the usual features like automatic line feed and the default font. But this relies on the front panel, and using it to set the default conditions is not simple – the markings on the front of the printer refer to normal use of the panel, not the special mode, so constant reference to the manual is necessary. A separate overlay for the front panel would be a good idea. Macro 1 overrides some of the initial settings too – very confusing.

If you find DIP switches difficult to understand, this won't be easier. The best system is that on the NEC P2200, where the printer asks multiple-choice questions and you answer.

Paper parking is good – two buttons to press and the continuous paper slides out the back. You can then feed single sheets through the front or rear with a single button press, and another press brings the continuous paper back when you've finished. The excellent short tear-off allows you to feed the paper up half an inch, tear it, then lower it back down with two button presses – so you can tear within a quarter-inch of the bottom of a sheet of continuous paper.

The print quality is excellent, perhaps the best yet from a 24-pin printer; the figure shows the five resident fonts (Courier, Prestige, Script, Sans Serif and Bold PS) plus the fast-draft style. You can do italics, sub- and superscripts in letter quality, although you don't have the 'decorative' outlining or shadow options offered by, for example, the Epson LQ500 and the Star LC24-10.

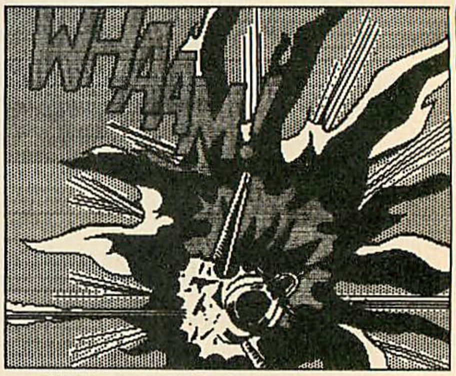
This is due to the printer emulating the Epson LQ2500, not the smaller LQ800 or 500 models. Plus there's no facility for adding new fonts on cards – you have to use downloadable characters. And if you decide you want to redefine the whole character set you must have the optional 32k printer buffer. The built-in 7k buffer is only enough for about 50 characters in LQ mode.

As recompense, there is double height and width, and the printer can feed the paper backwards reliably. The quiet mode is often vital, as the printer seems noisier than many of its rivals. The printer also emulates the IBM Proprinter, which is useful if you have an Arc and the PC emulator.

The Epson-style graphics commands work faultlessly, in both 8-pin emulation and 24-pin modes. Tried with the 24-pin screen dumps printed in *Acorn User* (April and May 1988 issues), it was noticeably slower than the Citizen HQP-40, but produced fine quality dumps. In common with other 24-pin printers, paper feed is in units of 180ths and 60ths of an inch, and there is no emulation of the Epson ESC '*' 5 command, used for proportional screen dumps.



Full graphics compatibility...


...with Epson LQ 24-pin dumps

This means there are problems with software that expects an Epson FX80-type graphics printer. But tested with software configured for an Epson LQ printer, there were no problems. It even works with the proportional spacing printer driver printed in September 1988's *Acorn User* – not all 24-pin printers do.

With a suggested retail price of £447, but typically selling for around £350, the KX-P1124 is very good value.

To sum up, the combination of good software compatibility and print quality recommends this printer, even though it is noisy and a bit difficult to set up.

Archimedes Games

ORION



Skillfully manipulate Orion, the latest air to air combat interceptor, to defend your planet against the tide of marauding aliens. Shoot them down before its too late! Score points by saving your men before they are changed into mutants - otherwise they will turn against you. Contains Baiters, Pods which explode into Swarmers and waves of Bombers. Orion is a fast and furious scrolling 'shoot em up' game based on the all time arcade classic.

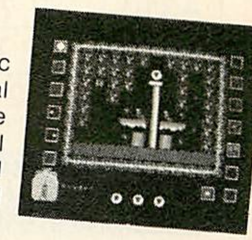


NEW

HOVERBOD



Hoverbod is a traditional maze adventure in the style of the classic Manic Miner, yet it is of stupendous proportions. Hoverbod, the yellow sperical droid, has been banished from the planet Zingle and goes in search of some stolen treasure. The player must guide him through the perils which befall him and help him puzzle his way through the eight different levels to the final quest level. But beware ... the Ibbles and Squibbles start to materialise !!!!



FREDDY'S FOLLY

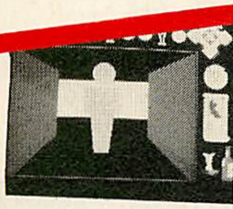


An enchanting game using animated graphics. Just watch the little men load the canon and pull it along. Notice the celebration when they win! Colourful fun for all the family. Sir Freddy is sneaky and envious of your castle so plans to bomb it with a fleet of balloons. You built a battlement to shoot down Sir Freddy in his balloon. Sir Freddy then hired several Gun ships to shoot your canon crew. Defend your castle and shoot down the balloons and the invading ships.

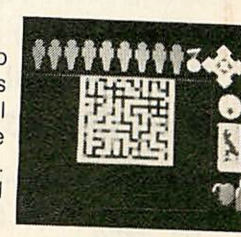


NEW

MINOTAUR



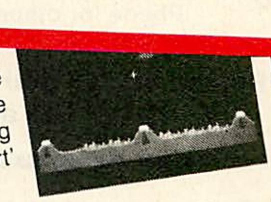
The Minotaur maze game is aimed at a market for children or adults who want a game where quick shoot-out reactions are not necessary. Theseus walks around the Labyrinth, collecting items to assist in the search of the ill fated men which have been provided as food for the Minotaur. The ultimate aim is then to kill the Minotaur and lead the men out of the Labyrinth to safety. The maze size is fully definable by the User. Games may be saved and reloaded for use at a later time.



MISSILE CONTROL



Missile Control is a classic arcade game written for the Archimedes to make full use of the advanced graphics and sound, while remaining faithful to the original concepts of the game. The Player is in control of the missile launches and must do the utmost to protect the cities from the incoming missiles. On each subsequent attack further planes, satellites or 'smart' missiles attack the target cities.



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HARDWARE

CAPTURED IN COLOUR

Rob Wilmott sees both good and bad in the production version of a video digitiser for the Arc

A digitiser takes a 'TV-style' video signal and allows you to store it in the memory of your computer, or display it on screen. An Archimedes video digitiser was probably the first add-on expansion podule ever demonstrated for the Arc — it was first seen at the *Acorn User* show in 1987, when the Arc made its debut.

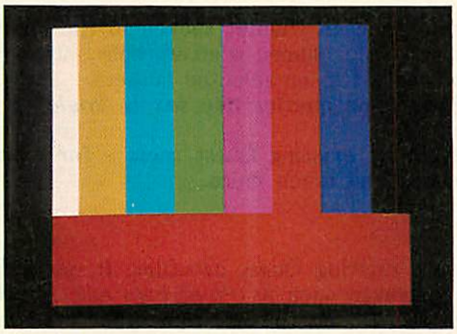
The production version is now available for £287, from Watford Electronics. It is a single-width card which slots directly into the rear of an A440; 300-series machines need a backplane fitted before you can add any podules. The printed circuit board is competently designed, but the soldering is not that neat and some of the components are of low quality (particularly the capacitors).

This cheeseparing is also shown in the use of a BNC connector attached to the board by a loop of wire — a board-mounted socket would have been better. The rear metal bracket lacks the usual Acorn-inspired T-piece, but is a simpler and cheaper arrangement that does the job admirably. The board fits in and runs without problems when combined with all of the other cards tried (including hard discs, sound samplers, Acorn I/O podules and ROM boards).

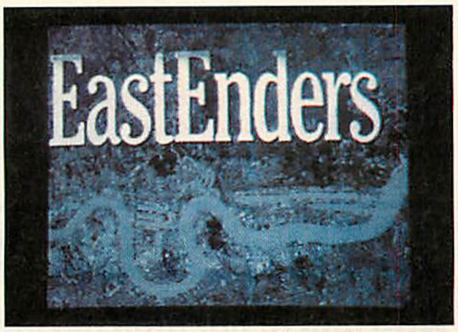
The manual is remarkably lucid and excellently produced — it is easy to understand the software side of things.

Installing the card is simple, as it connects up to a video source like a video camera or a TV tuner. There's no bother with software — it's all stored in ROM on the card itself and downloaded into the Arc automatically. And there's a nice selection of demonstration routines, which give you an idea of what the digitiser and its software are capable of.

It shows you can grab still images from video, grab individual frames from moving pictures either when a key is pressed or continuously, and manipulate the images on screen in a variety of entertaining ways. A simple *SEE command allows you to see whatever video you feed into the digitiser on screen. So



Simple test with saturated colours



Slight tone changes: a more demanding test



Colour picture, digitised in three passes

you can grab an image, scale, rotate and distort it and even fill areas on the screen with the picture — the software can scale the image to fit in any space on the screen. There are a number of SWI calls provided so you can use these effects in your own programs: well-written demonstration programs show you how.

On test, the unit proved able to digitise pictures from almost any video source, from videocassette players (in particular those with a video out-socket and a mono switch), laserdisc players such as the Domesday system, cheap black and white video surveillance cameras through to professional broadcast-quality cameras and test equipment.

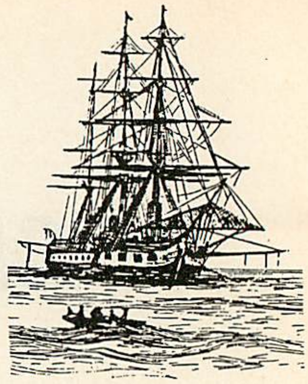
The screenshot of the coloured bars shows some of the quality of the hardware, but is a simple test because the colours are all full-strength (saturated) colours: the test equipment fed the digitiser with pure red, green and blue signals. The digitiser performs extremely well in this area.

A more demanding test involves a picture with gradations of tone, and lots of slight colour changes. The toning function of the software does a reasonable job of getting the picture to look good, but this does show up a lack of 'bit resolution' — there are 64 colour levels, a good number for most applications (compare the 64 levels with eight on a typical BBC eight-bit digitiser). But it's not quite enough for tones to blend smoothly: greys tend to jump from one value to another abruptly.

Part of the problem here is the display: on an Arc you can only display 16 shades of grey, rather than the 64 necessary. You really need a composite video input to your monitor to show this digitiser at its best. Almost all mono monitors have composite inputs, but the standard Arc colour monitor has its composite circuitry removed; the similar Philips 8533 model retains it. All the pictures grabbed by the digitiser are essentially monochrome, though as well as grey, 'pseudo-colours' may be used on screen to display them.

The software allows you to grab video images in any mode, even the multisync modes of a 440. The highest resolution is 512 by 512 pixels, or 512 by 256 in a normal mode. The number of shades displayed depends on the number of colours available in the current mode. In two or four colour modes, dithered patterns of dots are used to represent the grey shades. And in mode 12 (16 shades), you can take a digitised picture and turn it into a sprite. Pictures can be used in your own programs with *SCREEN-

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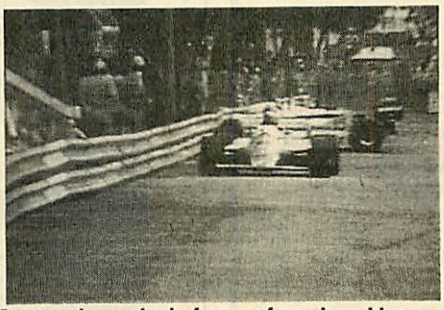
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HARDWARE

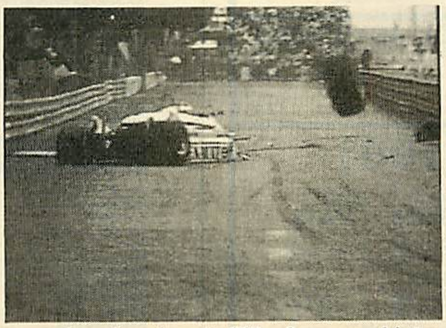
LOAD, or as sprites. The BBC *Volcanoes* interactive video disc used hand-drawn diagrams, digitised then tidied up in *Artisan,* then recorded on the laserdisc.

There is a built-in screen dump that prints out the digitised pictures on 8 or 24-pin printers. You can vary the final size of dump, even printing it as a mosaic on several sheets of paper. And there's a dot-pattern editor included so the grey tones used by the dump can be altered.

The most impressive feature for people used to previous Beeb digitisers is that it can grab pictures in 'real time'. That is, a single frame of moving video can be digitised, then transferred into the memory of the micro, before the next frame is received a twenty-fifth of a second later. In fact this isn't quite true, as in higher resolution screen modes, only every second or third frame is grabbed (because it takes too long to transfer to the Arc's main memory). But it is possible to watch *EastEnders* using the digitiser and a TV tuner. And you can apply effects such as moving the picture around the monitor screen at the same time.



Captured – a single frame of moving video . . .



. . . and again a twenty-fifth of a second later. In fact, in higher resolution screen modes, only every second or third frame is grabbed.

One of the utility programs on disc allows you to capture colour pictures even with a simple mono camera: you need three colour filters to grab the red, green and blue components of a scene one at a time, and the mouse-driven utility combines the three images into one colour picture.

The podule software also contains a couple of image-processing commands. One smooths the image and removes spurious noise by averaging every pixel with its neighbours, but reduces the detail. The other is a median filter that tries to remove some noise from the image by altering only pixels that seem wildly different from their neighbours.

The Watford digitiser is simple to use, some of the software is impressive, and it is possible to put the pictures it grabs to good effect. It looks expensive, considering the overall construction quality, but still offers reasonable value for money.

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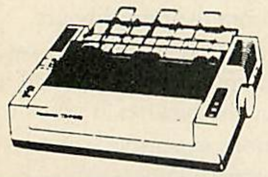
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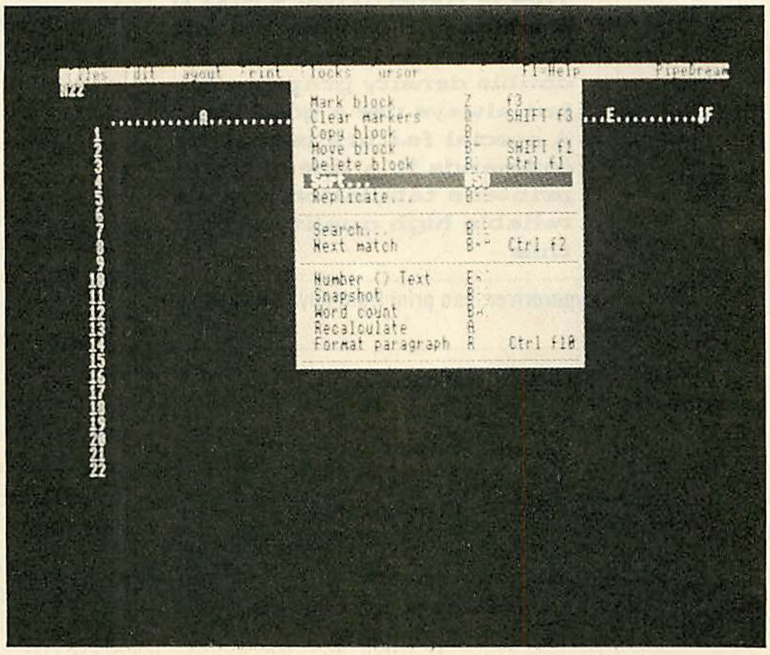
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SOFTWARE

DRIVEN TO DISTRACTION

Getting your micro to communicate with your printer is not always easy. Robert Elwell examines two utilities that should help



It would be intriguing to know just how many pleas for help with a computer problem really relate to a printer. Getting our British computer to talk to a (usually) Japanese printer can be difficult. These two ROMs are an attempt to simplify the process, and they allow you to use the whole range of your printer's capabilities with a wordprocessor.

One of these ROMs supports the *View* wordprocessor in particular, while the other is a general purpose printing utility, which can enhance the use of *View*. Although both packages can drive daisywheel printers, their real relevance is in gaining fuller use of a dot-matrix printer. In theory, dot-matrix printers are completely flexible; in practice endless patience and unlimited paper are likely to be needed. Both of these ROMs can help you get the most from your printer.

Watford Electronics' *View* Printer Driver ROM seems initially to be the complete solution to *View* users's frustration. I am a fan of *View*. I persevered with version 1.4 when the only alternative was the original *Wordwise*. Now I use version 3 with a Watford Shadow RAM Card, and I've often cursed the difficulty of getting text printed in the way I've wanted it.

Yet I am not certain whether this ROM is the solution. Part of my dismay comes from the accompanying manual – it's an excellent manual: clear, informative and quite open about the limitations of the ROM software. These limitations stem largely from the nature of *View* itself..

A virtue of *View* is that text to be printed is passed through a printer driver, which interprets highlight codes in the text, and outputs the appropriate control codes to the printer. A different printer with different control codes doesn't mean editing the entire document (as might be required in *Wordwise)*; you just need the right driver for your new printer. The disadvantage is that the memory available for the driver is limited so it can't be too complex, and there are cumbersome collections of formatting characters visible on the screen. You wouldn't want to get what you see in *View*.

HYPERDRIVER PROPORTIO
This is Hyperdriver's NLQ t
combination of Palatino and
Wallace Nicoll. Printing is c
double density graphics for
but always use a good qual
A special feature is that Hy
commands in a line of NLQ
printer's tabulation and ma
reliable high quality propo
this: -

Hyperdriver: can print from any language

Driver	Printer
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FX85	Epson FX85/105
GLP	Centronics GLP
	Brother M1009
Facit	Facit 8105
Flowriter	Ricoh Flowriter 1600
HI80	Epson HI80
HR15	Brother HR15
JP101	Acorn/Olivetti JP101
JX80	Epson JX80
Juki	Juki 6100
Kaga	Kaga/Taxan KP810/910
	Canon PW1080/1180
LX80	Epson LX80
MX80	Epson MX80/100
NLQ	Watford Epson NLQ ROM
RX80	Epson RX80/100

Table 1: View Printer Driver ROM

Watford Electronics' solution is characteristically sophisticated. Its ROM contains a range of 15 ready-made drivers for the most common printers, listed in the table. And it also has a driver generator – a program which will produce a driver for any printer providing you know the control codes it uses. The resulting driver has to be saved to disc. In addition, there is a preview mode that shows what you will get on the screen.

Acornsoft's extended highlight sequences and microspacing are mirrored in the Watford ROM. There's a bonus for anyone still using *View* 1.4: a routine in the ROM will allow you to print from memory, instead of having to save your text to a file, and then printing it.

If this were all there was to the ROM, it could be dismissed immediately as unnecessary expense. *Acorn User* has published several programs to generate drivers, and there's also a driver-generator bundled with *View* 3.0 (drivers for screen, memory and common printers are included).

But Watford's ROM comes into its own in the additional control it can provide over the printer. It offers XDRIV (eXtended DRIVer) facilities, which can give control over characters per inch, lines per inch, and character set selection, as well as a mnemonic way of achieving printing effects – 'NLG' means enlarged text, 'BOLD' means bold. If your printer has a Near Letter Quality mode, you can control this from the text. If you don't have NLQ but you do have Watford's NLQ ROM, your printing can take advantage of the other ROM's presence.

The disadvantage of using XDRIV stems entirely from the inadequacy of *View* itself. When formatting text, *View* quite properly disregards the highlights on a line when counting the line length. But it treats XDRIV mnemonics as text – it counts them as characters. The result is text which is justified neither on screen nor when printed out.

In text which is only going to be printed once, the answer is to type, review and format the text, then add XDRIV codes afterwards. But to amend the text again would be a nightmare. You'd have to remove the codes, edit,

ILLUSTRATIONS BY JONATHAN INGLIS

reformat, then add the codes again in order to maintain the justification. It would be fairly unusual to want to use the XDRIV facility in this situation.

The final limitation of the ROM is that for any of its printer drivers to work, the ROM must be in the machine doing the printing. A ROM image on disc won't work. You will not be able to take your text files, with their particular embedded XDRIV codes, to another Beeb with a better printer, unless it too has a similar ROM fitted.

Hyperdriver

The second ROM to be reviewed here, *Hyperdriver,* has the alternative title 'The Ultimate Printer Control System'. This isn't quite accurate, but it is a reasonable attempt. Unlike the Watford ROM, which is protected against piracy, *Hyperdriver* includes a ROM image on disc, as well as help and demonstration files. The difference between this ROM and the Watford one is that the print facilities are available from any language – not just *View* – and even from second processors and different operating systems like DOS Plus or CP/M.

Hyperdriver is far more complex in operation than the Watford ROM, and its 90-page manual is a delight. Not only does it explain the ROM's facilities in great detail, but it also has an illuminating chapter on the vagaries of printers. A technical section reveals which areas of the computer's memory *Hyperdriver* uses for workspace.

On the disc accompanying the *Hyperdriver* ROM are programs to work out what degree of compatability your printer has with the Epson 'standard', and to demonstrate all the possible effects. Amusingly, you can use this to show not all Epson printers are completely Epson-compatible! There are example files showing the capabilities of the ROM when using *View, Wordwise, Wordwise Plus* and *InterWord.*

All the facilities of *Hyperdriver* are accessed by star commands. They consist of a two letter mnemonic, so *LF is a line feed, while *LF10 is 10 line feeds. The list of commands is exhaustive, even setting horizontal tabs, vertical tabs, changing colour and disabling the end-of-paper detector are possible from simple star commands. There's also a primitive ROM manager: *Hyperdriver* can pass on commands to any other ROM in your machine.

One disadvantage of *Hyperdriver* is that the less Epson-compatible your printer, the more effort you will have to invest in getting all the features to work. This is because for non-compatible printers, you can define your own command sequences, called macros, which will pass to the printer the control codes you have selected to achieve a particular effect.

So if your printer needs special codes to do bold, you define these as a macro that replaces the original bold command. There can be up to 10 macros, and once defined, they work exactly like the pre-set commands. It is a very simple matter to save, reload, and modify macro lists.

Not only can the ROM produce very strange and wonderful effects like condensed italic subscript, it also serves as its own NLQ ROM: there's a complete and attractive proportionally spaced typeface. Another interesting facility is that it can print the contents of the screen, but using the screen's character definitions. And this of course will include any of your user-defined characters set with VDU 23. A final refinement is 'keyboard recording', which effectively acts as an extra function key.

When using *View,* typing *VD loads *Hyperdriver's* printer driver. All *Hyperdriver's* commands can then be embedded in the text, allowing good flexibility in print out. It is easy to get carried away with the sheer variety of typestyles available. *Highlight 1* starts a command sequence, and *Highlight 2* finishes it. The commands are exactly the same as the star commands.

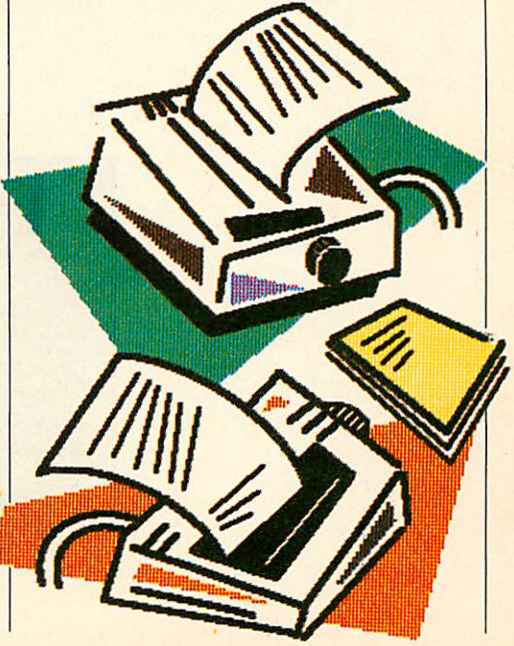
However, *Hyperdriver* is no better than Watford's ROM in coping with formatted text containing the printer commands. The highlights are ignored, but the instructions between them are treated as ordinary text. Just as with the Watford ROM, it is better to lay out the text first, then add the printing instructions. And if you change things like the number of lines per inch, it is up to you to work out how many there is going to be on the page – otherwise *View* will get the page breaks wrong. Again the effects are only available from a micro equipped with the *Hyperdriver* ROM or the ROM image in sideways RAM.

Both Watford's ROM and *Hyperdriver* are pushing *View* just a little beyond its natural limits. A wordprocessor should improve ease of writing and clarity of presentation. Both ROMs can improve the latter, but at the expense of considerable effort in composing the document in the first place. *View 3* is now three years old, and it's unlikely to be upgraded again. So software authors are stuck with the screen handling of printer commands.

While I personally am content with *View,* if I had to achieve a variety of unusual effects in my printing I would probably export my text to a desktop publishing package. At least I'd have a better idea of what was going to go where on the paper.

If I had no other printer driver software, or if I was starting from scratch with *View* and a dot-matrix printer, I'd buy Watford Electronic's *View* Printer Driver ROM. It's robust, compatible with all my hardware and software, and can work at virtually whatever level of sophistication is demanded by the task to hand. It's virtue – dedication to *View* – is also its limitation. It's a lot of money to pay for something which works with no other wordprocessor, and which duplicates many of the functions provided in free or bundled software.

You wouldn't want to start with *Hyperdriver* as your only *View* printer driver. It may be that you can't appreciate just how clever *Hyperdriver* is until you experience the frustration of cajoling your printer to do something odd. It does make a super upgrade to Computer Concepts' now obsolete *Printmaster* ROM. *Hyperdriver* is more of a general purpose utility – which incidentally enhances *View.* It also enhances *Wordwise, Wordwise Plus, InterWord,* and probably any other program which sends output to the printer. If you want to improve printing generally, buy *Hyperdriver.*



BUSINESS

THREE GOOD IDEAS

Roger Carus takes a look at some more suggestions for making practical use of the BBC micro

Starting the eighth of this series it seemed a good idea to look back and see who was coming up with all these good ideas for business applications for the BBC micro. So I looked at the 30 or so I have written about: there have been about as many more ideas suggested, but not written about, and 23 readers have asked for information about those which have been reported.

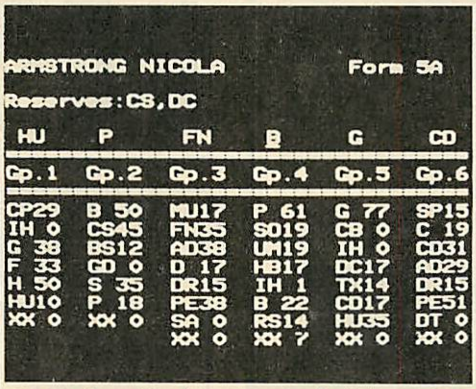
The ideas have come from all over the place, with four from Ireland and two coming from the Netherlands. To my surprise London and the home counties have produced less than their fair share and the Midlands quite a lot more than you'd expect.

The people writing are equally varied. There have been several teachers, particularly from higher education, but not nearly as many of them as I expected at the start, and there has been almost no shopkeepers who had originally seemed the most likely group.

Instead, I've heard from printers, auctioneers, bankers and debt collectors, plus several engineers and designers. Perhaps the greatest surprise is the number of contributions from people working in the arts as graphic artists and potters. About a quarter of those writing are retired and I am sorry to say that there have been only two women.

The type of ideas that have been produced almost always arise from the work the contributors are doing or from their leisure activities, and are mostly specialist applications. The most popular types seem to be concerned with textile design, and records of weather and personal finance. The range of applications is very wide and extends from fortune telling to yacht design!

Everyone is welcome to contribute suggestions and I acknowledge all ideas that I get, even though I cannot use every single one of them in the magazine. Some of the readers who write want my opinions about their work and that is much more difficult, as a lot of it is beyond me. Not many of those who write are trying to make money out of their ideas, but a few have succeeded in doing just that.



Screen from Alan Dean's school admin system

The first report this month is from two men who have been very successful in marketing their work. Alan Dean from Nottinghamshire has written a comprehensive school administration system which his partner David Harding is helping to market. He has been so successful that it is now being used in about 150 schools. As David says, you do not need to have an IBM to produce the information that schools have to keep these days, and the BBC micro offers a much more economic solution. Their system sells at £160.

It is suitable for use in primary and secondary schools and is so complete that I could not find any type of listing that it did not have ready, but I must admit to having been away from real school administration for a long time.

If you are interested in learning more about it, get the specifications from David Harding, 837 Bridle Road, Burton Joyce, Notts NG14 5FS, or telephone him on (0602 31) 2180.

A completely different report came from John Kemp in Zambia a year ago, just before he returned to Kingston-upon-Thames. While in Africa he worked with the Christian Literature Press, a non-profit making organisation based in Zambia. Its main objective is printing Christian literature for use by missions there and in surrounding countries.

They introduced BBC model B computers in 1984 to help with administration, particularly job-costing and invoicing, for which programs were specially written. This was very successful, but the original model B was stolen and in 1986 replaced by a Master 128k with dual disc drives and an Epson FX85 printer.

As well as the earlier programs, John wrote software to carry out payroll and cost analysis tasks, and a hard disc has since been added to cope with the customer database. This database will eventually contain information about all jobs done since 1972, when the Christian Literature Press was first founded. They have even more plans for future software developments.

The last story this month is from nearer home, in Scunthorpe, where Dr Gordhandas, a general practitioner, is making good use of a BBC B for his records at the Ashby Clinic. He keeps the usual patient register on an integrated program he has written which also has the facility to separate the modules. The suite has a capacity of 8000 records.

Dr Gordhandas has also converted the program for use on a Master with a hard disc. This downloads data to floppy discs, which gives him a convenient automatic back-up.

By way of relaxation, he has also written an integrated wages program so that all the quarterly information required by the Family Planning Clinic is ready and waiting!

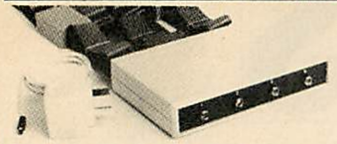
Have you done something to add to the collection or would you like to get in touch with any of the people mentioned? If so, let me know.

IDEAS WANTED

If you use your micro for business or pleasure or have written a piece of useful software and would like to share your knowledge and experience, write to Roger Carus, c/o *BBC Acorn User*, Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ, or via British Telecom Gold: 81RED001.

Quality Products for the BBC Micro

PRINTER SWITCH-BOXES

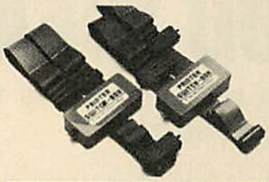


These useful switch boxes are ideal for use in the office or at school. No need to keep swapping cables over just press the button! The cables supplied are 2 x 1.7m + 0.4m with appropiate connectors fitted. Both versions may be used with a plotter if required. Super value.

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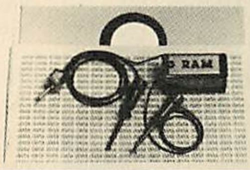
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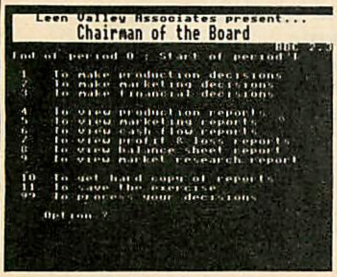
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LETTERS

BBC Acorn User, 20-26 Brunswick Place, London N1 6DJ. BTG/TTNS 81:RED001

CHAIRMAN'S REPORT

Sir, In his November review of *Chairman of the Board,* Michael Leete makes two major criticisms. The first is that the exercise does not precisely mirror the operations of a real business. This is true, but the distortions deliberately enhance the learning process. The second is that a calculator is needed when using the exercise – this aspect is not an oversight. Planning outside the exercise (using a calculator or a spreadsheet) is an integral part of the learning process. The exercise is a surrogate for the real world, in which a calculator or spreadsheet would be used as a matter of course.



A real business operation?

Chairman of the Board sells for £39.95 and not the £60 that Mr Leete quotes. We do not believe any other package offers better value. For readers who would like to test this assertion for themselves, a demonstration copy of *Chairman of the Board* is available for £5.

Paul Finlay
Leen Valley Associates
36 Trevor Road
West Bridgford
Nottingham NG2 6FT

POLISH UP YOUR POLISH

Sir, It is probably quite rare that you receive letters from Eastern Europe. However, there are a number of people like myself in Poland who own Acorn computers. I am writing to tell you of a BBC User Group that we organised this summer in Warsaw. There are about fifteen people, mostly with Masters.

We rarely travel to England and are therefore limited to our small society. Any correspondence would be greatly appreciated to the following address:

Piotr Pagowski
ul Perzynskiego 13/70
01-855 Warsaw
Poland

I look forward to any letters or contact with BBC users visiting our country.

Piotr Pagowski
Warsaw

LEADING QUESTIONS

Sir, The company I work for produces both software and hardware for a range of eight-bit machines. Recently it has upgraded to a range of 16 and 32-bit machines including several Archimedes 310 computers.

Obtaining interfacing parts for the eight-bit and the other 16 and 32-bits was not a problem but it was for the Archimedes.

As there is no user port on the Archimedes we decided to use the mouse port to register values for hardware such as trackerballs and graphics tablets. However, all our enquiries could come up with was a DIN plug similar to the one on the end of the mouse cable on the Arc.

We would be grateful if you could help us in this area.

Sol Brown
Tearsoft



Trackerballs can enter mouseholes

In fact, a BBC-compatible user port is part of the Acorn I/O expansion card. We have no knowledge of where the 'mouse-sized' DIN plugs can be obtained (you might try one of the larger electronic components suppliers such as RS or Farnell). But Pineapple (39 Brownlea Gardens, Seven Kings, Ilford, Essex IG3 9NL) sells a lead that links a trackerball through the Arc's mouse port.

READING FOR THE BAR

Sir, I am interested in building a bar code reader for a BBC Master computer. Despite not owning such a computer, I would like to make a bar code reader for my school.

I looked through my incomplete pile of *Acorn Users*, but to no avail. Could you please help me find a relevant article, as I am sure this has been done before. The Radio Spares bar code reader costs £200!

Matthew Shaw
Stroud

An article about bar code readers did appear in the December 1984 issue. This described the use of readers, plus the theory and practice of how they work. Details of the reader concerned can be obtained from PMF Datapoint, Noak Hill Rd, Noak Hill, Romford, Essex RM3 7LL; tel. (04023) 48956.

TERRIFIC TERRAMEX

Sir, The point I would like to make is that after reading your review of *Terraxex* in the November issue I went out and ordered it straight away because it really looked and sounded good.

After playing it for many sleepless nights I have come to the conclusion that the review of this game was an understatement (not being unkind to the reviewer). The game is brilliant, and I can definitely recommend it to anybody with an Archimedes. And I hope that many more software houses will recognise the potential that the Archimedes has to offer.

S Mansfield
Margate

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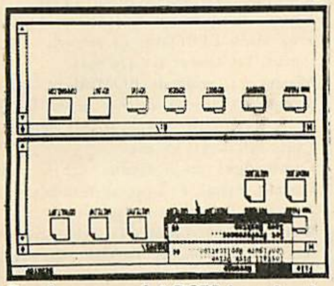
LETTERS

GRAPHIC DESIGNS

Sir, I run a bench of four unexpanded BBC Bs at our school.

One of the most useful ROMs is *Pendown* by Logotron, but it has no graphics capability. Can you suggest a program or ROM that would give me that capability without interfering with the *Pendown* ROM.

Christopher Price
Merton Court School, Sidcup



Pendown: useful ROM in schools

Almost any graphics ROM, such as AMX *SuperArt* or Watford's *Quest Paint,* can be used to produce graphics. Both are quite easy to use, and are suitable for most older schoolchildren. Younger students can be introduced to BBC Soft's *Picture Craft* or *Image* by Cambridge University Press, or *Acorn User's* own *Kiddie Art* (January 1987 issue – back issues can be ordered using the order form on page 115).

CIRCUIT TRAINING

Sir, In September's *Acorn User,* Andy McLements was requesting information or circuit diagrams for 6502 controller cards.

A suitable diagram for a 6502 controller was published in *Electronics and Wireless World* in December 1984, by Peter Nicholls. Machine code for the controller can be developed on a BBC micro, and programmed into EPROM for use in the controller.

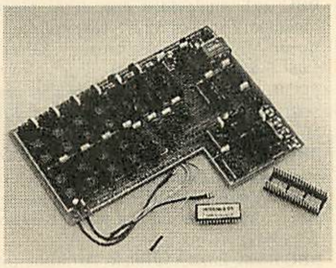
C Parkinson
Avon

MOVING SIDEWAYS

Sir, I own a BBC B. I now want to upgrade it to a 64k or 128k machine with sideways RAM, and also to add more ROM space. Could you please tell me which board I should get as it is starting to drive me mad reading all these articles, trying to decide which one would be best!!!

A R Evans
Wrexham

There are a number of boards available, although one in particular might suit your needs; the Integra-B from Computech could be ideal for your purposes. The board is meant to emulate a Master 128 in that it has 64k sideways RAM, 12k private RAM and 20k shadow RAM. It also has a real-time clock and eight free ROM sockets. It costs £130 from Computech (The Garth, Hampsfell Road, Grange over Sands, Cumbria, LA11 6BG); expensive, but good value if you don't already have shadow RAM or a ROM board. The board was reviewed in the July 1988 issue of *Acorn User*.



Computech's Integra-B board

SERVICE WITH A SMILE

Sir, I recently had my *DOS Plus* boot disc modified by Programmable Systems Design to provide the numeric keypad facility which enables the BBC B to access the IBM keys necessary for certain software applications.

When trying out the modified disc, I encountered some difficulty in making a back-up copy and rang PSD for their advice. My call was taken by Ken Fullbrook who rang me back later that evening to discuss the situation. Although it was quickly established that the fault was not caused by his modification, he spent over half an hour on the phone establishing exactly what was wrong.

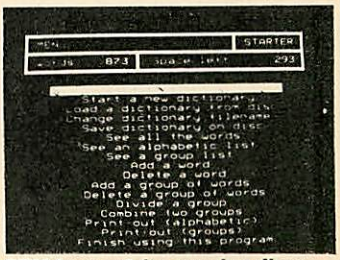
To meet this courtesy and consideration following such a modest financial outlay is worthy of mention and commendation and I would like your readers to be aware of it.

Rex Conway
Carmarthen

MASTERING SOFTWARE

Sir, Inspired by the recent price fall of the Master 512 board I rushed around the M25 to Watford Electronics and paid my money. Once home, I had no difficulty in installing the board and getting started.

So far I have found that most of the software I've tried has worked, but for every program that doesn't there are a number that will. So why worry? Cost — well, yes there is that, but public domain or shareware software allows you to 'try before you buy', for only the cost of the disc — between £1.50 and £5. Up to now, I've not made a dud purchase. Some of the keys need to be sorted out as the Master doesn't always have those mentioned or the combinations don't work, but I find with a bit of time and effort, you can usually find one that does. For example, Mr Campbell (Letters, December 1988) mentions *PC File* won't function without f10 but I've found that in *PC Type+*, a shareware wordprocessor, fo works fine for f10. As *PC Type+* is compatible with *PC File,* I would expect the same to happen.



GEM is great for copying discs

The software I've tested which appears to work, without problem or with only a few key changes, are:

PC Type+	– Wordprocessor
Flodraw	– Flowcharting program
Supercalc 3.1	– Popular spreadsheet
AsEasyAs	– A Lotus 123 clone
Reflex	– A database
Delta	– A database
Printshop	– Design letterheads
Chess88	– Chess program

By the way, GEM is a great method for copying PC discs from their original format to the 512 800k or 640k. Place the 360k disc in one drive and a formatted 800k or 640k disc in the other, point and click. As this leaves lots of spare space, you could create a directory to hold your datafiles or, by copying folders, make a disc set into one.

Ann Terry
Godstone

FREE ADS

Teenage girl penfriend wanted with BBC B, Discs + pen. Into Adventures, *Neighbours*. Robin Keith, 7 Fulford Ave, Retford, Notts, DN22 7XR.

BBC/Basic books (5), *Wordwise, Ultracalc+*, both boxed as new. Exmon EPROM programmer. All for £50 ono. Tel: Brian Blandford (0258) 53742.

BBC ROMS for sale: *InterWord, InterSheet, Wordwise* plus, £25 each. Owner upgraded to Mega-ROM. Tel: 01-948 3970 (South-west London).

BBC B ROM/RAM board dual disc drives, 20 ROMS including *View, Viewsheet* plus games and joysticks, £395 ono. Tel: Oxford (0865) 391267.

BBC B+ 32K with Watford DDFS, reference manual and dust cover, £225. Tel: 01-672 5059, eves.

Magazines Acorn User (from 1982), Micro User (every issue), A+B User (every issue). Will split. Offers? Tel: (0332) 668033.

Music System, sound library, utilities, £17, *Aviator* £7.75, *CastleQuest* £5.75, Toolkit EPROM £11, graphics ROM £9. Tel: 07618-521.

BBC B 100k drive, 32k sideways RAM, View, Spellmaster plus others. Datacentre, joysticks, £300. Tel: (037-881) 4417, eves.

BBC model B ROM board. Wordwise, Pascal, D Doctor, Seikosha CP500 printer. Challenger3 disc drive, discs £400. Offers? Tel: (08243) 225.

Opus 40T disc drive with games, £25. Sideways expansion, eight ROMs plus 16k battery-backed RAM, £12. Tel: (0664) 69119.

Green screen 12-inch, ageing but useful, suit BBC. Christmas bargain, only £15. Tel: (06284) 4874.

Acorn Electron 64k. Plus1, Plus3, Brother HR5 printer, Commstar interface. Pace Nightingale modem, 3.5-inch discs, T2P3ROM, offers?. Tel: (0535) 43985.

Electron, Plus1, Plus3, ROMbox, Logitec printer stand, Pace Nightingale modem. Many tapes, ROMs, cartridges, all manuals £450. Tel: (025672) 4507.

BBC B OS 1.2, Sanyo colour monitor, computer cassette recorder. Lots of games, £300. Tel: (0533) 416703.

BBC B Torch Z80 dual drive 40/80T 'Perfect' systems. Microvitec high-resolution colour monitor. Interface, joysticks, manuals, discs, £350. Tel: (0208) 850277.

BBC B+ 64k, Cumana disc drive, 40-80DS, tape drive, about 40 titles of software, books. Mint condtion. Offers. Tel: 01-244 9892.

BBC ROMs, *Centurion*, over 60 utilities, *Spy2, Exmon II* (latest). Monitor, advanced toolkit, *WordWise Plus* manual, £15 each. Tel: (06284) 4874.

BBC B Wordprocessing system. Twin 40T drives. Epson FX80 printer, Philips monochrome monitor. Sidewise ROM/RAM, *ViewSpell*, £600. Tel: (0542) 71463.

Philips BM7522 monitor (amber) £40. *View3*, £25. *View2.1*, £15. *ViewSheet*, £15. *ViewStore*, £15. *Viewspell*, £10. *Spellcheck III*, £15. Tel: 01-267 1533.

BBC B series 7 with DFS and 40T self powered disc drive, manual included, £225 ono. Tel: (0753) 883800 (Gerrards Cross).

Watford 32k shadow RAM board, £38. Watford solderless ROM board and 16k RAM and battery, £25. Tel: Guildford (0483) 223721.

Merry Xmas: Opus D/S switchable drive, £80. Solidisk 128k sideways RAM, £50. tel: 01-861 4380 eves.

BBC model B+ DFS interface. Cassette player, games and manual. Unwanted gift, still in box, £250. Tel: John (0493) 730193.

Master 512. Double discs, EPROM programmer, *ViewSheet*, PCB. Diagram II Meta Assembler. All on board, £600. Tel: (06286) 61064.

BBC B issue 7, Acorn DFS, software, £225. Disc drive, 40T, double sided 20 5.25-inch discs, £75. Tel: Sunbury 788322.

BBC firmware, originals & manuals. Enigma ROM manager, *Wordwise Plus*. Watford print ROM, Disc Doctor utilities, all £10 each. Tel: (06284) 4874.

BBC B 40T disc drive, Kaga high-res colour monitor, Sanyo tape recorder, *Wordwise, Viewsheet*. Many games (tape and disc), £450. Tel: (037284) 3559.

AB design Microbrush graphics system. EPROMS, discs, comprehensive manual for BBC B and Master. Cost £150, bargain £65. Tel: (0255) 880257.

BBC B OS1.2 DDFS, doublesided drive, printer. Quest mouse, paint, software. Cost £850, selling £350, ono. Tel: (0284) 701779 eves.

BBC B DFS Z80 Torch Pac, + Perfect software, £375 ono. Tel: (0945) 64486.

Plus 1, *View, ViewSheet* and Hopper cartridges cassette recorder. Joystick, software for Electron. All boxed, £45. Tel: (0271) 72274 Eves.

BBC B colour monitor; dual DS/40/80T drives; teletext; adaptor board. SW RAM(16k) Z1F; Replay; cassette; more, £100. Tel: (0443) 202735.

Swap my Morley teletext adator, plus ATS ROM for Acorn 6502 2nd processor. Tel: Sheffield 690303 Dave, Eves.

Newsletter magazine for Acorn Users. Send SAE for details to: Richard Leggett, 24 Penryn Close, Norwich, NR4 7LY. UK only please.

Archimedes ROM Podule battery 128k RAM, £60. Acorn AP100A printer, £45. Sony 3.5-inch disc drive, £60. Tel: (0334) 78171, eves.

BBC B joystick, cassette recorder, manuals and £400+ worth of software. Includes *Revs, Elite* and *Crazee Rider*, £250. Tel: (0553) 86309.

Metal case Microvitec 1431 for sale. Used for about 50 hours, £75. Buyer collects. Tel: 01-878 5261 (eves).

Master Compact colour monitor. 5.25-inch 40/80T external drive. Software, magazines, ROM-images, etc. Cost £1000: offers? Tel: Richard, Nuneaton (0203) 346554.

BBC B issue 7, with new unused Watford 3.5-inch doublesided 1-megabyte, 80T disc drive, + ADFS, guaranteed. Bargain, £350. Tel: (0267) 82388.

BBC B colour monitor, dual drives, Z80 second processor. 14 ROMs, *View, Viewsheet, Enigma, Spellmaster*. 60 discs, games, £499. Tel: (0462) 683985.

Microvitec Cub colour monitor, as new, boxed. Model 1431, only £100. No offers. Tel: (0703) 225393, eves, James.

Slogger Pegasus 4000 system. Electron disc upgrade, £100 ono. Also tapes free. Tel: Chris Price 01-300 2112 eves.

Solidisc sideways RAM, utility disc, cartridge base, cartridge manual, £15. Tel: Taunton (0823) 289378.

Dual BBC joystick, also fits Plus-1, £8. Edword-2 ROM with manuals, £14. 16k sideways RAM, new £14. Tel: Holywell 714274.

Electron Plus-1, data recorder, all boxed. Much software, including *View Mini Office*, games, magazines, books. Excellent condition, £120. Tel: (0223) 811802.

Philips 75-2 Hi-res monitor, £60. Grundig/Newark 14-inch REM/CONT, colour portable TV/monitor, Med-Res, £195. Viglen Master cart.system, formats, £12. Tel: (0268) 693770 (Essex).

BBC B +games, utilities and magazines. Will split. All originals and very cheap, for details, tel: Mark (0742) 580101, (eves).

Enigma disc imager ROM, £5. Speech ROM, £5. Mouse ROMS software £55. SWR, £15. Games, joysticks, £35. Tel: (0227) 262560.

BBC B issue 7, 40/80T switchable d/drive, £440 ono. ATS ROM +teletext adaptor, £70. *Wordwise*, £15. Disc Doctor toolkit, £25. Tel: (0227) 262560.

Electron, Plus-1, £100. Games, new power supply, data recorder, joysticks. Mags, manuals, good condition, £100. Tel: 01-855 3109 (eves).

BBC ROM *Wordwise*, £10 ono. Tel: Farnham (0252) 722472.

BBC B DFS twin 40T drives, PSU *View2.1* Disc Doctor, software on disc, £300 ono. Tel: (0865) 391721 eves.

BBC B Series-7 32k, leads, manual. Genuine reason unsuitable for my application. Going PC. Good working order, £190 ono. Tel: (0945) 773359.

BBC B Watford DFS, double drive (40/80T), ROM/RAM board, Microvitec 1451 AP, TV tuner, PMS 2nd processor, mouse, software. May split, £600. Tel: Andy 01-732 3537.

PRES A+3 disc drive and T2+3 ROM, £90. Acorn Plus-1, Pres Plus-1 Upgrade ROM, £35. Tel: (0267) 235677.

BBC 40T single-sided disc drive. Good condition, £25. Tel: Rhys (0908) 55426.

Epson MX100, £40. Panasonic KXP1081 plus four ribbons, £100. Printerdriver ROMs, utilities on disc. Superior games. Send SAE: A Provan, 5 Garvel Rd, Milngavie, Glasgow. Tel: 041-956 6106.

BBC B (1.2) Cumana Twin DS.DD, power supply, Taxan KP810 printer. Acorn teletext. HCR program eraser, Digimouse, paper, discs, ribbons, software. Bargain. Tel: (0782) 516610, Ken.

BBC B 16k sideRAM sideROM Music 500 2x40/80T drives. Philips colour tv/monitor 230 discs. 20 ROMs. 100s mag/manuals, £750 ono. Steve (051) 6484419.

BBC B no RGB, no RS423, Acorn DFS, 100k disc drive, Solidisk 32k SWR, ROMs, £300 ono. Tel: (0203) 610268.

BBC B+1770 DFS ATPL ROM/RAM *Inter-Chart* ROM, Floppywise ROM cartridge, 12 spare. Various manuals, £110. Tel: 01-789 0605.

Electron manuals, leads in original box, plus £100 software. Good as new. Only £35 ono. Tel: David (0376) 515205.

Electron with data recorder. Two manuals. 50 games, 50 magazines, excellent condition £65 ono. Tel: Graham (04027) 58081.

Opus Challenger 5.25-inch disc drive. 512k RAM disc, ADFS compatibility plus books, £110. Tel: (0203) 465115.

Master Compact, green monitor, 3.5-inch and 5.25-inch drives, RS232, modem, joystick, £450 ono. Tel: Sean, Halifax (0422) 43305 (eves/weekends).

BBC B issue 7, Opus DDFS 40/80T drive. *Replay*, RAM/ROM card. Many games, utilities, books, cassette recorder and *Acorn Users* Jan 85-Dec 87, £475. Tel: Harpenden (05827) 61917.

BBC micro, RAM/ROM board, dual drives, Epson LX80 printer, AMX mouse, *Wordwise*, discs, ROMS, books, software, £775 ono. Tel: Spencer (0244) 390093.

Eprom programmer and eraser, £30. 20 2764 blank EPROMS, £1.50 each or £25 the lot. Tel: Onkar 021-429 7915.

Master 12, manuals ROMs/discs, £240. Twin 800k 40/80T drives. Acorn Plinth, £120. Microvitec 1451 colour monitor, £140. Tel: (0525) 376269.

Cambridge co-processor 32016 with Fortran, Pascal, C, Lisp, all manuals, 25k, £450 ono. Tel: Mike 01-834 5019.

Watford CLS200 200k 5.25-inch disc drive. Nearly new, £60. tel: Berkhamsted (0442) 866895.

Archimedes A310M colour, lots of games. Only a month old, £900 buyer collects. Tel: 031-661 7663.

Wanted BBC Master 128 system. North London/East Midlands/East Anglia area. Tel: (0480) 216278 eves.

Wanted Any sideways RAM from 16k and above for cheap prices. Please write to: 28 Calonne Road, London SW19 5HJ.

Wanted: Gemini DDD-base disc (preferably 80T). Also DDD-calc with manual. Tel: (0395) 265987.

Wanted, Archimedes 310, Colour monitor and software. Sensible prices only. Tel: (0872) 865449.

Wanted Electron ROMs, *ViewStore, ViewSheet*, extension ROM cartridge. BBC *View 2.1* for sale. Tel: John (0670) 367429.

Wanted Compact without monitor but with *ViewStore* if possible. Good price paid. Tel: (0270) 878881.

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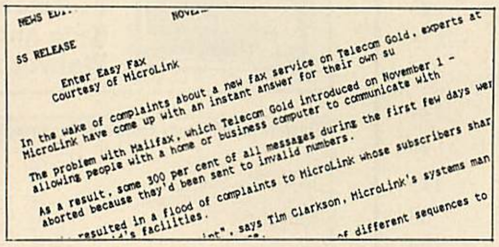
DIARY

Tabletop terminology

With all this talk of future computing around, some ideas escaped the brain cells of the *BAU* team. TQ's favourite was the holographic keyboard for your portable, which would, of course, roll up to fit in a pocket.

And what about the new terminology? All these home-workers will have 'tabletop' computers, rather than desk-tops. When speech processors come out we'll have 'mouth-ware' and syntax checkers called 'mouthwash'.

Vision systems will add a new dimension to computer specs, with eyeballs replacing the tracker version. And last but not least, the day someone invents a smart input de-vice that decides to run away we really will need mouse traps!


NEWS ED... NOVE...
SS RELEASE
Enter Easy Fax
Courtesy of MicroLink
In the wake of complaints about a new fax service on Telecom Gold, experts at MicroLink have come up with an instant answer for their own su
The problem with Halifax, which Telecom Gold introduced on November 1 - allowing people with a home or business computer to communicate with
As a result, some 300 per cent of all messages during the first few days wer aborted because they'd been sent to invalid numbers.
...resulted in a flood of complaints to MicroLink whose subscribers shar ...'s facilities.
...nt", says Tim Clarkson, MicroLink's systems man ... of different sequences to

Fax of life

We really wanted to do a news story about the new Easy Fax system on Uncle Derek's email service Microlink, but we couldn't read the fax! It doesn't seem able to write three lines in a row (see left).

The fear of software dying

Phillip Lewis of the DES came up with the best quote of the month at Resource's education conference: 'I don't appear to have satisfied a lot of people.'

And at the same meeting, Mike Matson, the creative brain behind most of 4Mation's educational output, told the parable of the desert island. Unfortunately, it wasn't a happy tale, the gist of it being that there wouldn't be any discs around as far as educational software was con-cerned if the DES and DTI didn't sort themselves out.

His views on the DTI's software subsidy were mainly unprintable, and delegates were left wondering where the logic was in not being able to spend any of the money on 8-bit software.

Schools can use the money to buy a 16-bit Nimbus ver-sion of the four-year-old *Granny's Garden*, but not the 'state of the art' *Worlds Without Words*, because it only runs on an 8-bit BBC.

Teletext star

The Beeb's a star of the high-tech Museum of the Moving Image in London. While a PC handles the video discs, a Master runs the teletext dis-play of the top 100 TV programmes.

And Beebs were in action again in *First Born*, teaching Gor – the one with an ape for a mother — to speak. Come to think of it, we know some PR men who could do with a go on one.

Congrats . . .

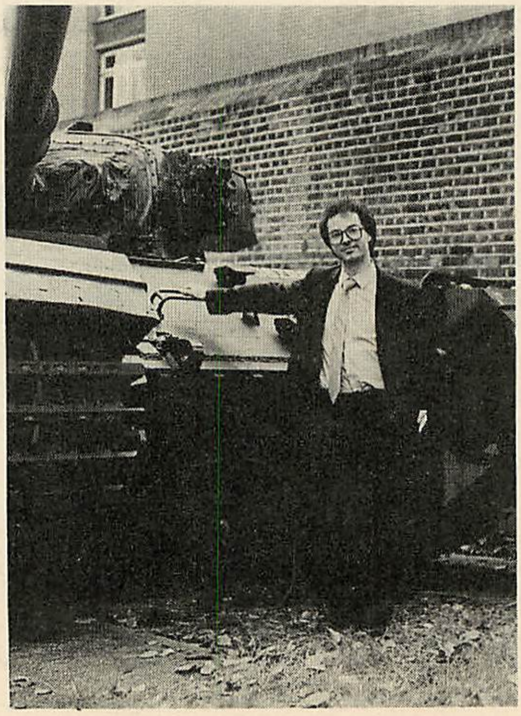
Acorn's tenth birthday co-incides with Bruce and Tessie Smith's wedding anniversary (congrats). And Dave Clare got married on November 17 (more congrats). No-one rated the idea of his honeymoon spent at Acorn.

Bell wins ding-dong

Graham Bell and Mark 'Army' Webbing came out tops in the CDS *Tank Attack* contest at the game's launch – it's due soon on the Beeb. They trounced the duo led by one of the game's authors, but then he was severely hampered by Dumbo Darrin from *A&B Nincomputing*.

Bell (whose leadership style many people liken to General Patton) commented: 'At last my years of training as a paleo-ecologist have paid off.'

And the launch led to Big Ed Quinn winning his domestic Chocolate Wars. Better half Linda had been inundated by pressies from Citizen – chocolate coins. But the National Army Museum's chocolate medal was four times the size! Thanks to CDS software for the press pack: the 'knapsack problem' is a hoary one in computer circles – but his knapsack was smaller than usual.



New number?

Expect a number change on the Arc any day now. Acorn supposedly renamed Arthur 2 as RISC OS because of the Dudley Moore film of the same name. We hate to tell you: Volvo has released a 440.

Designer den

Acorn User has moved offices again – for the fourth time in six years. Fortunately, we didn't go far, just into the Redwood Dungeon. So if there are any mistakes in this issue, they're down to the damp, dark, airless conditions.

But in these trendy days, and with the new name *BBC Acorn User*, we thought we'd come up with a designer label for the new den: BAUHouse.

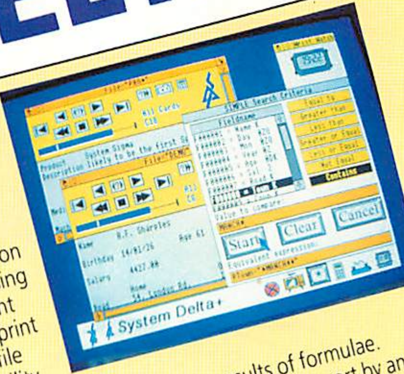
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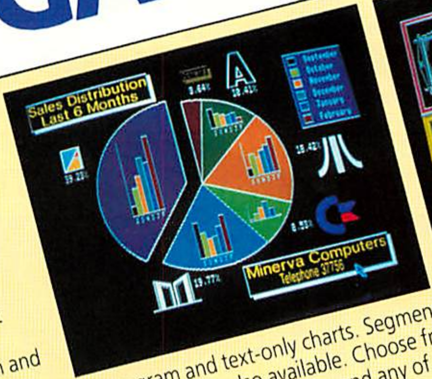
SYSTEM DELTA

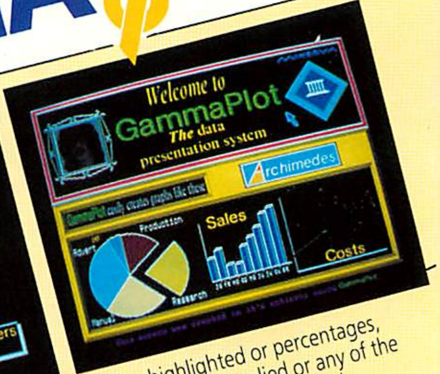
System Delta is the most comprehensive database available yet. It's so simple to operate that it has already become the standard in educational fields. It is very professional and pleasing in its presentation, making full use of the genuine Archimedes WIMP environment. It can handle vast amounts of data in the office, school or home, with its capacity of 2.14 billion records and 16 million fields. Its multiple 'key fields' allow any record to be found in 1 sec. even in a file of 20,000 records.



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GAMMA PLOT



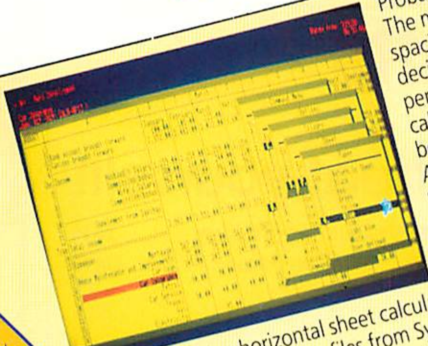


Seeing is believing! GammaPlot is an extensive chart/graph plotting program with a full art package included. It allows even a novice to produce stunning charts and drawings on one screen. Several charts may be placed on one sheet, in any position with text or drawings to make the data easily understood.

GammaPlot supports six main graph and chart types of line, scatter, pie, histogram, 3D histogram and text-only charts. Segments may be highlighted or percentages, values and labels switched on. Statistics are also available. Choose from the text styles supplied or any of the native Archimedes 'pretty fonts' or even define your own, and any of these can be enlarged or reduced. Various shapes, patterns and borders are supplied with a full 256 colour range. Full zoom facility. Various pen types are provided to draw pictures or add signatures. Import digitised pictures or company logos. Print facilities include colour output. Data entry is via the keyboard or any Delta, Gamma or Sigma file.

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